# Social mix, local services, and social capital in Scotland

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# Abstract

Background:

Social mix has become a prominent policy approach in the UK that aims to diversify the socio-economic composition of neighbourhoods in order to provide a host of economic and social benefits to residents. A central outcome that mixing is expected to achieve is the improvement of local services. The rationales for social mix have arisen from evidence around the negative impacts of spatially concentrated disadvantage on residents' life chances, which have provided incentives for policy to redevelop low-income, single-tenure areas into mixed communities.

Social mix initiatives in the UK and Scotland have most often been carried out by increasing levels of owner-occupation in areas dominated by social rented housing and low income levels. The arguments for mixing can therefore be argued to largely rely on the expected benefits of middle-class home-owners, where three mechanisms are identified. First, the introduction of middle-class households is expected to increase income flows to help sustain services in the local area (economic capital). The second type of influence refers to cultural capital as the tendency of middle classes to be more assertive in their demands and engage with officials to influence service provision, while service providers may also be more receptive to their issues. Thirdly, the presence of middle-class home-owners is assumed to increase levels of social capital through their involvement in the local community, which may encourage residents to collectively influence the provision of local services.

The New Labour government (1997-2010) placed social mix at the core of their neighbourhood renewal agenda which was designed to tackle the social exclusion of disadvantaged neighbourhoods. New Labour's efforts to reduce the gap in outcomes between deprived and non-deprived areas is said to have represented a holistic approach, which combined targeted neighbourhood programmes and mainstream public service funding to better address problems. A further key focus became partnerships between local agencies,

the public and the third sector. The initiatives placed emphasis on social capital as a means for communities to influence service provision, work in partnerships, and improve their outcomes. Social mixing was expected to increase levels of social capital and thereby encourage participation in community organisations to influence service provision. New Labour further addressed services through a public sector reform and increased funding to public services, which might be expected to narrow the gap between deprived and other areas in terms of service outcomes.

The potential impacts of mixing on lower-income communities have however received criticism. It is questioned whether potential income flows from high-income residents support services that are accessed more by low-income residents, while greater cultural and social influence over services can imply that service provision is shaped towards the needs and preferences of middle-class residents.

Local services provide an interesting research subject in the context of social mix and relating to wider structural imbalances in service provision. This thesis views local services as a key attribute of the neighbourhood opportunity structure and a constituent of social welfare that can influence citizens' quality of life by providing an additional resource that connects citizens to wider society. However, previous evidence has consistently found deprived areas to fare worse in the access to and quality of many public and private services, despite equalisation efforts by means of local government funding. Investigating the New Labour period that saw increasing service expenditure with an emphasis on centralised efforts to promote more equal outcomes allows the thesis to provide insights into the possible impacts of reducing expenditures and devolving responsibility in more recent years.

Research aim and approach:

The thesis undertakes a quantitative study to examine the associations between various types of mixed area and outcomes in local services through the following Research Questions:

1. Are the access to and quality of local services perceived to be better in more mixed areas?

2. Did area differences in service access and quality reduce during the New Labour period?

3. Does area social capital help to explain variations in the perceived access to and quality of local services?

The thesis uses a novel dataset compiled by linking data from the Census and two separate household surveys. Local service outcomes are derived from the Scottish Household Survey (SHS) (1999-2002 & 2009-2011) which provides two large cross-sectional samples of the Scottish population. The data provides three outcome measures: Frequency of Use, Convenience, and Satisfaction with Services. Altogether eight summary indicators are constructed for different groups of services. Consistent outcome indicators are compared at two time periods corresponding to the early and late years of the New Labour government. Analysis of the service outcomes is carried out through multilevel modelling, taking into account the nesting of responses in small areas.

To measure neighbourhood social mix, the thesis constructs a neighbourhood typology through cluster analysis of household tenure from Scotland's Census (2001 and 2011). The neighbourhood clusters are defined at two area levels: data zones and intermediate zones, which are subsequently attached to the survey datasets.

Finally, the study constructs small-area estimates of social capital using data from multiple waves of the NHS Greater Glasgow and Clyde Health and Wellbeing Survey. The estimates are attached to the SHS dataset in order to address RQ3.

<u>Findings:</u>

The study finds positive associations between most types of mixed area and residents' perceptions of the access to and quality of local services. The area type consisting of nearly even proportions of owner-occupation and private

rent, along with some social rent, contributes to positive variation in a majority of the outcome indicators. Most associations with area types hold at data zone and intermediate zone levels, while the latter analysis yields fewer significant associations. The results from cross-sectional data are however interpreted with caution, as they may be subject to potential selection effects.

The analysis further concludes that areas with the lowest levels of deprivation are more likely to have positive outcomes in services. However, the results question the effectiveness of economic demand from higher-income households in supporting services in local areas, as variations in the patterns of service use for different income levels are discovered. In turn, more deprived areas are consistently associated with lower levels of access to and quality of services, implying that differences persisted despite targeted efforts of the time to improve services in these areas.

Comparing results at two time periods shows slightly weaker associations between tenure mix and the service outcomes in the later period, possibly implying that area differences narrowed. However, deprivation remains a strong negative predictor of multiple service outcomes. Finally, the analysis concludes that social capital contributes to minor positive variations in local service outcomes, while social capital does not diminish relationships with individual and area-level predictors which remain stronger explanatory factors.

The thesis lends some support to the policy practice of implementing tenure mix, as mixed areas tend to be associated with better outcomes for services. However, the findings in regard to area and individual income levels imply that policy should exercise caution in the application of tenure mix as a tool to address structural imbalances in service provision and undertake realistic assessments of the needs of different resident groups from local services. Further, the results do not lend great support to the emphasis on social capital as a tool to address local areas' service provision.

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# Author's Declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Signature:

Printed name: Johanna Jokio

# Abbreviations

| | |
|---|---|
| B | Regression coefficient |
| CFA | Confirmatory Factor Analysis |
| DZ | Data zone |
| IZ | Intermediate zone |
| NHS HWB | NHS Health and Wellbeing Survey |
| OO | Majority owner |
| OO-PR | Owner mixed with private |
| OO-SOC 1 | Majority owner mixed with social |
| OO-SOC 2 | Owner mixed with social 2 |
| RQ | Research Question |
| SC | Social capital |
| SE | Standard error |
| SHS | Scottish Household Survey |
| SIMD | Scottish Index of Multiple Deprivation |
| SOC-OO | Majority social mixed with owner |

# 1 Introduction

Social mix has become a predominant approach in urban policy across many higher income countries that aims to diversify the socio-economic composition of neighbourhoods, often through the mechanism of tenure mix. Mixed areas that contain a wider range of tenures and incomes are often perceived to provide a host of economic and social benefits to residents, including improvements in local service provision. In the UK, the concerns for the increasing spatial concentration of urban disadvantage gave rise to the policy impetus to reduce concentrations of social housing to give way to more 'sustainable' and socio-economically mixed communities (Lupton, 2003; Kleinhans, 2004). The New Labour government elected in 1997 accorded a prominent role to social mix as part of their neighbourhood renewal agenda which was designed to tackle the social exclusion of disadvantaged neighbourhoods and reduce inequalities between areas. In addition to targeted neighbourhood regeneration, New Labour also addressed local services distributions through their public sector reform (UTF, 1999; Lupton et al., 2013a; Needham, 2007).

In the UK, social mix policies have primarily focused on increasing levels of owner-occupation in low-income social-rent dominated neighbourhoods, while the promotion of home-ownership has expanded as part of a general retrenchment of state provision in housing (McIntyre & McKee, 2009; Rowan, 2015). The recommendations for mixed tenure compositions have therefore largely relied on the benefits of middle-class home-owners, whose influence on the local area is generally considered to transpire through economic, cultural, and social channels (Chaskin & Joseph, 2010; Matthews & Hastings, 2015). This can occur through three means. The first is that the introduction of middle-class households is expected to increase income flows to help sustain services in the local area. The second type of influence stems from the tendency of middle classes to be more assertive in their demands and engage with officials to influence service provision, while service providers may also be more receptive to their issues. Finally, the presence of middle-class home-owners is assumed to increase levels of social capital and collective efficacy, reflected in their involvement in the local community (DETR, 2000; Sampson et al., 1997).

The neighbourhood initiatives of New Labour placed particular emphasis on the role of social capital in improving outcomes in disadvantaged areas. Social capital has featured as a central argument for mix interventions that expect low-income residents to advance their economic outcomes through accessing the wider social networks of higher-income residents. The social mix agenda of New Labour also assumed mixed communities to host higher levels of social capital and promote resident participation in community organisations in order to cooperate with local service providers (DETR, 2000; Kearns, 2003).

Against these positive views of social mix, concerns have been raised as to whether developing mix brings benefits to lower-income residents in mixed neighbourhoods (Chaskin & Joseph, 2010; Cheshire, 2007). The potential income flow from high-income residents may not support services that are accessed more by low-income residents, particularly universal services, while economic viability of private services in the local area may be undermined by higher-income households' ability to spend elsewhere and make more use of private provision of services (Bramley & Evans, 2000; Duffy, 2000; Atkinson & Kintrea, 2000). Moreover, greater cultural and social influence over services can imply that service provision is shaped towards the needs and preferences of middle-class residents, at the expense of lower income groups (Lees, 2008; Jupp, 1999; Tersteeg & Pinkster, 2015).

Local services are part of the neighbourhood context that social mix policies have sought to address (Tunstall & Fenton, 2006; SEU, 2001; ODPM, 2003). As an attribute of the neighbourhood opportunity structure, services have a redistributive function that can contribute to citizens' welfare and quality of life. Access to goods and support services locally can constitute an important additional resource for households and connect them to opportunities beyond the neighbourhood. However, local services may also reflect or reinforce wider structures of inequality, and research continues to provide evidence of poorer outcomes in access to and quality of services in disadvantaged neighbourhoods (e.g., Bramley & Besemer, 2016). The primacy of the question for mixed neighbourhoods is further highlighted by the evidence concerning the tendency of middle-class households to hold an advantage in shaping local service provision, which allows them to gain more resources (Hastings et al., 2014). It goes without saying that the goal of social mix policies to try to alleviate some

of the structural inequalities by diversifying the socio-economic composition of low-income areas can be put into question (Cheshire, 2007; Slater, 2013).

The question around local services is of particular relevance in the current policy climate, where drastic spending cuts introduced by the post-2010 governments have left local authorities struggling to fund basic public services (Hastings et al., 2015). Furthermore, the agenda of recent governments has involved an emphasis on devolving powers to communities to take responsibility for running services, which appears to justify the retreat of state involvement in the name of community empowerment (e.g., Lowndes & Pratchett, 2012; Rolfe, 2016). The notion of community empowerment gained prominence under New Labour, particularly in the 'Third Way' agenda, which focused on creating partnerships between local communities and the public sector in service delivery. However, current austerity policies represent a significant shift away from New Labour's efforts to increase public spending and narrow the gap between deprived and affluent neighbourhoods (Lupton & Power, 2005; Durose & Rees, 2012). Investigating a time period of increasing service expenditure with an emphasis on centralised efforts to promote more equal outcomes can provide us with valuable insights into the possible impacts of reducing expenditures and devolving responsibility in more recent years.

## 1.1 Research aims and objectives

The overarching aim of this thesis is to examine the relationship between social mix and local services. The thesis views local services as an important attribute of the neighbourhood context and enquires whether local services are perceived to be better in more mixed areas. It examines potential change in outcomes for local services over the New Labour time period, and whether the social capital of mixed neighbourhoods can contribute to the outcomes for services.

The thesis focuses on achieving this aim through three research questions:

1. Are the access to and quality of local services perceived to be better in more mixed areas?

2. Did area differences in service access and quality reduce during the New Labour period?
3. Does area social capital help to explain variations in the perceived access to and quality of local services?

To address these research questions, the thesis undertakes a quantitative study to examine the associations between various types of mixed area and residents' perceptions of local services. The quantitative approach allows the study to observe patterns in the outcomes through a large representative sample of the Scottish population. In order to provide background to the study, the thesis begins with a review of literature around the topics of neighbourhood studies, social mix, social capital, and local service provision focusing on the UK policy context. The thesis proceeds as follows.

**Chapter 2** reviews literature and evidence from the fields of neighbourhood effects and social mix since these provide the main theoretical foundations for this work. The literature further draws on the theories around social capital. This focus allows us to identify the key arguments used to justify social or tenure mix policies and discuss how service provision can be affected by the neighbourhood context.

**Chapter 3** extends the literature review to the specific case of local services with a focus on socio-spatial inequalities. The chapter considers local services from a redistributional perspective and highlights evidence on the geographical imbalances in service provision in the UK context. The chapter discusses the policy initiatives under New Labour's neighbourhood renewal programmes and asserts the relevance of the study in regard to current policy.

**Chapter 4** outlines the methodological approach of the study. It sets out the overall approach and provides details on the key sources of data and how they are used to address the research aims. It outlines the modelling approach used. More detailed aspects of the specific measures used (e.g. the various service outcome measures or the measures of tenure mix) are provided in the individual analytical chapters.

**Chapter 5** constructs measures of neighbourhood social mix in order to include them in subsequent analyses. This allows the study to address the question of which type of mix may be associated with better outcomes. The chapter explains the method of cluster analysis which is used to produce a typology of Scottish small areas with different levels and types of tenure mix.

**Chapter 6** undertakes initial regression analyses of the main service outcomes through individual and household predictors, after descriptive analyses of the outcome variables in the study. The analysis allows us to identify patterns in service use, and perceived access to and quality of services for different households. This provides a background for the remainder of the analytical work which explores area-level variations.

**Chapter 7** addresses the first and second research questions by introducing area-level predictors into multilevel models of the service outcomes. The multilevel models examine the associations between varying types of tenure mix and the local service outcomes. To answer the second research question, the outcomes are compared at two time periods corresponding to the early and late years of the New Labour government.

**Chapter 8** addresses the third research question by modelling the contribution of social capital with the service outcomes in two separate analyses. A large part of the chapter is devoted to the construction of small-area estimates which allow the study to provide independent measures of social capital.

**Chapter 9** pulls together the conclusions from the thesis. It summarises the major findings, identifying the contribution the thesis has made to existing knowledge. It recognises the limitations which arise from the study design and data used, identifying possible avenues for further research. Lastly it discusses the policy implications arising from this work.

# 2 Neighbourhood effects and social mix

Concerns have been raised by both policy-makers and academics about the negative effects that concentrations of disadvantage can have on residents' life chances through various pathways including collective socialisation processes, physical isolation, and institutional resources. Many European countries, as well as the US and Australia, have adopted policies that strive to counteract the assumed negative impacts of concentrations of poverty by introducing socially-mixed neighbourhoods (Galster, 2007b; Kleinhans, 2004; Wood, 2003). In the UK, discussions surrounding urban disadvantage and 'problem' areas gave rise to the policy impetus to reduce concentrations of social housing and redevelop them into more 'sustainable' communities from the early 1990s. With the establishment of the Social Exclusion Unit in 1997 (SEU, 2001), the New Labour government introduced a number of neighbourhood initiatives, in which social mix featured as a key element (Lupton, 2003; Kleinhans, 2004).

The first section of this literature review outlines some of the key evidence and theories concerning neighbourhood effects. The neighbourhood effects literature posits that spatial concentrations of poverty and deprivation have independent detrimental effects on individual outcomes, which exacerbate the social exclusion and disadvantage of residents. The neighbourhood literature has provided rationales for policy that focuses on place-based initiatives to overcome the social exclusion of disadvantaged areas.

Social mix initiatives have tended to focus on 'balancing' the residential composition of low-income neighbourhoods mainly by increasing levels of home-ownership. One of the central arguments for mixed-housing interventions has focused on providing residents with more extensive networks and breaking up negative socialisation processes, which are assumed to help to counter problems related to social exclusion. A further key argument relates to the economic benefits accrued from the presence of higher-income residents and their ability to collectively improve levels of service provision in the area (Tunstall, 2003; Bond et al., 2011; Chaskin & Joseph, 2010). The section on social mix further identifies how assumptions about the benefits of

mixing for local service provision draw on the influence of middle-class households.

A large amount of research has emerged on the subject of social mix and neighbourhoods since the 1990s. The neighbourhood effects research has aimed to quantify the relationship between neighbourhood deprivation and individual outcomes in many domains, most commonly including employment, education, health, and crime (Ellen & Turner, 1997; Galster, 2001; Mcintyre et al., 2002; Sampson et al., 1997). These outcomes are considered to transpire through a wide range of mechanisms, which generally fall into two types of explanations: the 'internal' ones tend to focus on social-interactive mechanisms within the neighbourhood, while 'external' mechanisms consider the impacts of institutional resources and wider structural issues (Lupton, 2003; Ellen & Turner, 1997; Jencks & Mayer, 1990).

Despite the literature on neighbourhood effects being extensive, evidence of the impacts of neighbourhood mechanisms on individual and community outcomes has overall remained inconclusive (Ellen & Turner, 1997; Manley et al., 2011). Arguably, scarce consistent evidence of the presence of neighbourhood effects relates to the difficulty of making comparisons between different studies conducted in varying contexts of social welfare and housing supply (Friedrichs & Blasius, 2003). Research has also faced methodological challenges in finding causal relationships and untangling the effects deriving from place and those from individuals themselves. A particular challenge relates to selection processes driven perhaps most importantly by housing and labour markets that sort people into neighbourhoods (Cheshire, 2007). The lack of clear proof has led critical authors to argue that quantitative neighbourhood studies tend to overstate the role of the local environment over individual deprivation and structural issues such as labour market effects which constrain individuals' opportunities (Slater, 2013; Bauder, 2002).

This Chapter begins by reviewing some of the key mechanisms through which neighbourhood conditions may influence outcomes (section 2.1). After this, section 2.2 considers issues concerning the operationalisation of neighbourhood effects in research. The second part of this Chapter turns to

the question of social mix specifically, and reviews evidence of the impact of social mix in counteracting potential neighbourhood effects.

## 2.1 Poverty concentration and neighbourhood effects

Neighbourhood effects research investigates the impact of neighbourhood characteristics on individuals' opportunities. Aiming to capture the entirety of the neighbourhood context, Galster (2001; 2011; 2012) has classified the mechanisms through which neighbourhoods impact on individual outcomes into 'bundles' consisting of environmental (such as pollution), geographical (location), physical (housing characteristics), institutional (services and amenities), and social-interactive mechanisms. Others (Ellen & Turner, 1997; Sampson et al., 2002; Durflauf, 2004; Dietz, 2002) have made similar classifications of the mechanisms. While it would be difficult to exhaust the list of possible causal mechanisms on individual outcomes, this section provides an overview of the mechanisms that are considered relevant to further discussions on the impacts of social mix and the subsequent focus on local services: the social-interactive mechanisms and institutional influences relating to services, which are also considered as external barriers relating to the wider structural context. These aspects have also been put forward in social mix policies and their criticisms (Tunstall, 2003; Chaskin & Joseph, 2010; Cheshire, 2007).

### 2.1.1 Social-interactive mechanisms

A large amount of literature has considered neighbourhood effects to be transmitted through social-interactive mechanisms. The key mechanisms reviewed in this section relate to socialisation, role models, peer influences, and social order in neighbourhoods. Research on this aspect has arisen from the concern that the quality of social networks and interactions in disadvantaged neighbourhoods can be restricting in regards to employment and educational opportunities (Galster, 2011; Ellen & Turner, 1997), while the underlying arguments behind these mechanisms have received strong criticism (e.g., Bauder, 2002; Slater, 2013). The start of the discussion on negative neighbourhood effects is often attributed to William Julius Wilson (1987) who studied inner city poverty in the US where the withdrawal of industrial

employers gave rise to mass unemployment. With more affluent households leaving the inner city for suburbs, this started a negative cycle of neighbourhood decline with eroding service structure, increasing crime, and lack of opportunities. Wilson posited that male unemployment and the prevalence of single mothers led to the formation of a 'culture of poverty', which was to blame for anti-social behaviours. While Wilson states the structural problem of lack of jobs, in his theory, unemployment largely results from dysfunctional values of the 'underclass', who do not assign to mainstream norms and lack aspirations in regards to education and employment (ibid.).

Since Wilson's study, poor working-class neighbourhoods have been described as lacking social cohesion, which is manifested by negative socialisation and lack of role models to young people, and the prevalence of social disorder (Forrest & Kearns, 2001; Ostendorf et al., 2001; Sampson et al., 2002). Here, neighbourhood effects research commonly refers to the mechanisms of socialisation, role models, and peer influences, while their definitions sometimes overlap.

The collective socialisation mechanism is concerned with norms conveyed to children through both adults in the family and for example teachers as institutional role models (Galster, 2011; Jencks & Mayer, 1990). A central argument for this mechanism relates to educational outcomes, assuming that low educational aspirations are passed on to young people by adults in the area who are unemployed or have few qualifications. In turn, bringing in middle-class residents and higher-status households is expected to introduce positive role models for young people and responsible adults who would help to maintain social order in the neighbourhood. The influence on behaviours would occur either through observation of for example neighbours going to work, or more directly as feedback and accountability to adults in the neighbourhood (Friedrichs & Blasius, 2003; Ellen & Turner, 1997; Joseph, 2006).

A further social mechanism considers that negative influences for children and youth can transpire through peer groups. Jencks and Mayer (1990) similarly define peer influence as an 'epidemic' model which assumes that individuals adapt behaviours from their peers, and this mechanism is also referred to as social contagion (Galster, 2011; Ellen & Turner, 1997). Young people are seen

as susceptible to influences in local areas as their daily lives take place within a neighbourhood, and here particularly schools play an important role (Jencks & Mayer, 1990). Negative role modelling has been examined by Friedrichs and Blasius (2003). They discuss the mechanism of social contagion whereby observations of deviant behaviour models (acceptance of deviant behaviour measured as items such as shouting at children, public drunkenness, and teenage pregnancy) and interaction with deviant neighbours leads to the adoption of similar behaviour. However, they discovered that higher exposure to the neighbourhood or having a local network did not lead to more acceptance of deviant behaviours, undermining the assumption on negative role modelling (ibid.).

A further key process concerns social disorder as a reflection of low levels of social cohesion (Sampson et al., 2002; Forrest & Kearns, 2001). The 'broken windows' theory suggests that visual signs of disorder, such as broken windows, public substance abuse, and derelict houses, are indicators of the inability of residents to intervene in problems and assert social control. Signs of disorder may also give an indication of neighbourhood decline and make investors and service providers avoid the area. Perceptions of disorder among residents have also been linked to feelings of powerlessness and increased shame about how outsiders might view the area (for a summary, see Sampson & Raudenbush, 2004; Sampson et al., 2002). Studies have associated home-owners and those with higher socio-economic status with higher levels of social organisation and willingness to act for the good of the community (Sampson et al., 1997; Völker et al., 2007). Thus, the argument relies on the responsibility of middle-class residents, who are perceived as willing to exert social control.

Key criticisms on the social-interactive mechanisms of neighbourhood effects have addressed the underlying assumptions on influences and behaviours that are seen as inherently negative or deviant, and the focus on communities' internal attributes as causes of disadvantage. Criticisms have pointed out the paternalistic nature of the arguments for role-modelling and acceptable norms transmitted to low-income residents by middle-class households (Rosenbaum & Zuberi, 2010; Joseph, 2006; Bauder, 2002). Slater (2013) asserts that quantitative studies problematically assume negative behavioural models to affect young people in a certain way, while there is little or no explicit

evidence on the functioning of role modelling in neighbourhoods. Criticism has also touched on the language of disease derived from medical terminology, in which social interactions in disadvantaged contexts are referred to as spreading in an 'epidemic' manner (Slater, 2013; Bauder, 2002). Particularly as effects such as social contagion are rarely discussed in relation to higher-income households or middle-class areas, the association of the language with disadvantage risks adding to the stigmatisation of areas.

The approach emphasising cultural and behavioural models as the root of the problem in the production of disadvantage has tended to go uncontested in political and academic discourses. In Wilson's (1987) theory, cultural explanations were seen as a response to structural conditions. The notion of 'cultures of poverty' originally derived from the work of Oscar Lewis, but was further developed by right-wing sociologist Charles Murray (1994), whose work exacerbated the underclass rhetoric (McKenzie, 2015). The approach defines behaviours and phenomena, such as unemployment, single parenthood, welfare dependency as inherently pathological, making a distinction between those seen as adhering to mainstream norms and values, and those who are morally deviant. Critics state that this focus blames individuals for their social marginality by constructing an inaccurate link between social behaviours and negative outcomes while ignoring the socio-political context (Bauder, 2002; McKenzie, 2015). In this way, "the idea of neighbourhood effects […] obscures processes of […] class stratification […] and instead shifts attention towards the cultural attributes of residential communities." (Bauder, 2002, p. 88). Discourses on the urban underclass gained strength under New Labour, while it has been exacerbated by the latest Coalition and Conservative governments (Levitas, 1998; Lowndes & Pratchett, 2012).

### 2.1.2 Institutional mechanisms

A noticeable amount of the neighbourhood effects research has focused on social-interactive mechanisms to explain individual outcomes. Some have however stated that more convincing are the arguments for the impact of institutional actors in neighbourhoods and mechanisms arising from sources external to the neighbourhood, also known as exogenous mechanisms (Joseph, 2006; Atkinson & Kintrea, 2001). Criticism has gone on to point that the

emphasis placed on social mechanisms and the cultural approach diverts attention from inequalities arising from the disconnection of areas from jobs and services, and from external reputations (Lupton 2003; Kleinman, 1998).

Institutional mechanisms refer to the actions of employers, service providers, and external reputations that can have negative impacts on individuals' opportunities (Galster, 2012). The well-known spatial mismatch hypothesis originally termed by Kain (1968, in Van Ham & Manley, 2009) refers to the disconnection between deprived areas and the location of jobs. Spatial mismatch is often discussed in relation to inner city areas that have become isolated from job opportunities as a result of employers moving out of these locations. Mismatch can be driven by many factors, including residential sorting and impacts of housing markets, and problems with land supply, while a sectoral shift has led to the seizing of many types of manual work that could provide jobs for local residents. This geographical disparity can exacerbate the isolation of disadvantaged areas, particularly if transport to job locations is expensive or poorly available (Van Ham & Manley, 2009; Galster, 2012; Lupton 2003). The idea of disconnection extends to lack of services and facilities in disadvantaged areas, which restricts opportunities and access to information (Buck, 2001; Lupton, 2003).

Local services constitute a key institutional process in the neighbourhood literature, which has recognised how underfunded or poor-quality local services can act to compound the negative impacts of deprivation (Duffy, 2000; Buck, 2001; Hastings, 2009a). Literature on neighbourhood services has emphasised the role of urban service provision in intensifying spatial injustice and unequal opportunities between deprived and more affluent areas (Hastings, 2009a; Friedrichs & Blasius, 2003; Jencks & Mayer, 1990; Wacquant, 1993). While a further literature review is undertaken on this in Chapter 3, neighbourhood research has revealed some endogenous and exogenous mechanisms regarding local services.

Atkinson and Kintrea (2001) have described endogenous pathways through which poor quality and unavailability of services can lower residents' expectations of the level of services they can receive and create tolerance towards low standards. In this way, substandard delivery reinforces low

standards in service provision, and can feed into residents' expectations about political efficacy in improving services in the area (ibid; Duffy, 2000; Hastings, 2009a; Buck, 2001). In addition, political efficacy is highlighted through the competition mechanism as a neighbourhood effect, which considers that areas have to compete for certain resources that are limited (Galster, 2008; Buck, 2001). While the provision of most public services in the UK has been based on universality, the aspect of competition has become increasingly relevant with the retrenchment of state funding and transfer of responsibility for service provision to local communities (see section 4.4) (Hastings et al., 2015). In line with this approach, policies on social mix aim to partly address service provision by increasing levels of collective organisation, which will be discussed in later sections.

Service delivery is further affected by perceptions of the area held by service providers and market actors, constituting an exogenous pathway (Galster, 2008; Forrest & Kearns, 2001; Arthurson, 2012). Perceiving the area and its residents as problematic may lead public service providers to restrict resources distributed to deprived areas or private providers to avoid the area completely. There is evidence of double standards in terms of resource allocation to neighbourhood services (Hastings, 2009b), and cultural prejudice reflected in attitudes held by staff who label residents undeserving or difficult to deal with (Duffy, 2000; Dean & Hastings, 2003). Literature has described how service providers may have difficulty attracting qualified staff in deprived areas, such as teachers and GPs, which in turn is counterintuitive to overcoming disadvantage when residents are not provided support tailored to their needs (Hastings, 2009b).

External reputations constitute a key mechanism that can crucially affect areas' service provision, especially through the private sector, and individuals' possibilities for social inclusion. Materially disadvantaged neighbourhoods tend to also suffer from territorial stigma, which refers to long-standing and persistent negative images of the area and its residents. Wacquant's (1993) investigation on territorial stigma attached to poor urban neighbourhoods in the US and France asserts that the institutionalised nature of stigma intensifies the social exclusion of inhabitants. Wacquant (ibid.) recounts how discrimination from employers and private service providers against residents

of disadvantaged neighbourhoods is based on perceptions of 'ghetto' culture and cultural pathology, which are considered to reflect individuals' traits, such as attitudes and interpersonal skills. In this way, stigma perpetuates social differentiations made on the basis of class and/or ethnicity (also Sampson & Raudenbush, 2004; Bauder, 2002).

In the UK, particularly concentrations of social housing have been the target of negative stereotyping in media and political discourses. While neighbourhood stigma may be derived from their history of problems with crime and disorder, outside perceptions can often endure regardless of current true-worthiness of the image (Dean & Hastings, 2003). In their study, Dean & Hastings (2003) found the stigma of deprived housing estates to largely remain despite the physical regeneration they had undergone. Territorial stigma translates into negative stereotyping of residents and can act as a symbol of the inferior status of residents (Wacquant, 1993). Employers may deem applicants from stigmatised areas unemployable or unskilled or avoid advertising jobs in poor neighbourhoods altogether (Permentier et al., 2007; Dean & Hastings, 2003; Bauder, 2002). Residents' economic opportunities can also be restricted by refusal of being given financial credit or difficulty selling a house because of area reputation (Dean & Hastings, 2003).

However, it has remained relatively unclear whether reputations have discernible impacts on individuals' socio-economic outcomes. Qualitative evidence has often reported beliefs about employers' discrimination based on applicants' place of residence, but Tunstall et al. (2014) note that there is little evidence explicitly looking at the impact of reputation in employers' decisions. The authors' point out that employers tend to judge candidates based on other attributes, such as presentation, and concerns about location are more often mentioned in relation to travel distance to work. The study by Tunstall et al. (2014) examined the reputation mechanism by comparing the number of employers' responses to fake job applications from different neighbourhoods, and found no statistically significant evidence on the preference of employers for applicants from non-stigmatised neighbourhoods.

### 2.1.3 Linking internal and external mechanisms

This section has discussed neighbourhood effects arising from internal characteristics of neighbourhoods, which include social-interactive mechanisms, and effects stemming from external sources, such as service providers and other institutions. In order to better link the internal and external neighbourhood mechanisms, commentators have called for a better integration of the institutional and structural aspects that derive from city or nation-wide policies into research on neighbourhoods (Hastings, 2009a; Sampson, 2018; Sharkey & Faber, 2014). The approach put forward by Galster and Killen (1995) suggested incorporating the wider opportunity structure into neighbourhood effects research, while other researchers have made stronger appeals for the importance of capturing exogenous impacts on deprived areas (Hastings, 2009a; Buck, 2001; Bauder, 2002). The approach put forward by Galster and Killen considers neighbourhoods as an opportunity structure wherein individual choices are conditioned by the incentives and constraints defined by macro-level actors, such as labour markets and existing organisations in the area. This allows for both the agency of individuals and structural effects, recognising that neither the role of personal values and aspirations nor community and governmental institutions should be overlooked (Galster & Killen, 1995). Concerning research on neighbourhood services, Hastings (2009a) has highlighted how the interaction between external mechanisms (service provision) and the internal mechanisms of neighbourhoods pertains to some of the key concerns in the spatial distribution of services. As the internal problems of deprived neighbourhoods can place stress on public services, the failure from local authorities to compensate for higher levels of need in the local area reinforces stress on service providers and lowers service outputs (ibid.).

The implication of the structural appraisal is that quantitative research should incorporate variables relating to the physical and institutional neighbourhood context in addition to characteristics of the population in order to capture the mechanisms at work more fully (Friedrichs & Blasius, 2003; Sharkey & Faber, 2014). However, quantitative research has received criticism for struggling to identify the effects of wider macro-level processes in practice. Lack of consideration of macro-level influences may lead to the cause for an

individual's outcome being falsely attributed to for example negative socialisation effects and behavioural models, if studies are not able to incorporate for example labour market conditions or external reputations (Permentier et al, 2007; Bauder, 2002). The lack of attention to the detrimental effects of labour markets and other structural forces on the exclusion of deprived areas has led critics to advocate for better grounding of studies in the socio-political context, which for example may drive the stigmatisation of certain neighbourhoods and the exclusion of individuals from labour markets (Slater, 2013; Bauder, 2002). Slater (2013) has claimed that the lack of attention to the wider context leads research to perpetuate the causal explanation of neighbourhood pathologies and individual dysfunctions as the source of socio-economic problems. The limitations of quantitative studies to tap into these more subtle types of influence on exclusion highlights the need for qualitative data to provide explanations for certain mechanisms (Bauder, 2002).

## 2.2 Issues in the measurement of neighbourhood effects

Examining the above mechanisms, research has to address questions relating to the operationalisation of neighbourhood effects. These questions often relate to the spatial scale at which different mechanisms might function (discussed in section 2.2.1), whether effects are more important for some residents or at certain life stages (section 2.2.2), and whether effects occur after a certain threshold (section 2.2.3). Finally, section 2.2.4 focuses on methodological challenges for quantitative research.

### 2.2.1 Scale

First, defining the relevant boundaries for neighbourhoods has emerged as a central conceptual issue for research. An everyday understanding of 'neighbourhood' may be defined as the walkable area around one's home. However, what is understood as a neighbourhood may consist of multiple overlapping scales and have different meanings for each of the area's residents (Galster, 2001; Van Ham & Manley, 2013). Massey (1994, in Lupton, 2003) has proposed conceptualising neighbourhoods as overlapping sets of social

networks, where some social interactions take place at the block level, while other activities occur farther away. Following Suttles (1972), Kearns and Parkinson (2001) have suggested that neighbourhood exists at three levels. The first level, the home area, serves a psycho-social purpose by fostering feelings of attachment and interpersonal connections. Therefore this area level might be best fit for measuring social-interactive mechanisms. The second level, the locality, is where local services and local housing markets operate. The operation of services and housing markets is connected to the third level, the urban district, which determines wider economic and social opportunities (ibid.).

In measuring neighbourhood effects, quantitative studies have to a large extent relied on existing statistical boundaries. This raises questions as to whether pre-defined boundaries correspond to the experienced neighbourhood or are appropriate for the theoretical mechanism tested. For example, census tracts commonly used in US studies comprise 4000 residents, which might be too large a measure of 'neighbourhood', if the definition of it as a walkable area is used (Friedrichs & Blasius, 2003). Reviewers of neighbourhood research state that the definition and consequently the operationalisation of 'neighbourhood' has to be guided by the study objective and mechanisms examined (Lupton, 2003; Sharkey & Faber, 2014; Galster, 2001; Van Ham & Manley, 2010). Therefore, measuring different mechanisms requires adapting the scale at which the neighbourhood is measured. For example, in studying the effects of local labour markets, the relevant boundaries might be travel-to-work-areas (TTWAs) (Lupton, 2003). However, the choice of scale in quantitative research is often guided by available data. To overcome this, some studies have constructed bespoke neighbourhood boundaries where more fine-grained locational data is available (Bolster et al., 2007; Johnston et al., 2004; Östh et al., 2015). A discussion concerning the operationalisation of neighbourhood in statistics is undertaken in Chapter 5.

### 2.2.2 **To whom and when do they matter*?***

In addition to defining the boundaries within which mechanisms might operate, research has considered that the influence of the neighbourhood context may pertain to some residents more than others. This is because residents are likely

to experience and use the neighbourhood in different ways depending on their age and life stage, social class or other factors (Ellen & Turner, 1997; Forrest & Kearns, 2001; Bailey et al., 2012; Lupton, 2003). Studies have found that social ties with neighbours tend to matter more to residents with a functional need for local ties and support, such as the unemployed and elderly with limited mobility and resources (Guest & Wierzbicki, 1999; Völker et al., 2007; Fischer, 1982). A Scottish study found that social renters carried out most of their activities in the local area in contrast to owners, who were enabled by their resources to spend large amounts of time outside the neighbourhood (Atkinson & Kintrea, 2000). Further, life-cycle characteristics and opportunities are also reflected in the amount of time residents spend in the neighbourhood, which leads to them having different levels of exposure to the neighbourhood environment (Galster & Hedman, 2011).

A large amount of studies explore neighbourhood effects on children and young people, who are seen as particularly sensitive to influences in the residential environment (Briggs et al., 2010; Jencks & Mayer, 1990; Oreopoulos, 2003). Children and families tend to also spend more time in the local area. Many studies have measured associations between the childhood neighbourhood context and individual outcomes, while fewer have addressed exposure. A study with longitudinal Swedish data (Hedman et al., 2015) looked at young people's exposure to neighbourhood disadvantage and its impact on earnings in later life. It concluded that the effect of exposure to poverty on individual earnings depends on the time period where exposure takes place and the length of exposure. Temporary exposure did not negatively impact later earnings, but exposure to poverty however had a strong negative effect when it occurred later in life, after the start of a housing career in a poorer neighbourhood. The explanations given for the outcomes stated that more recent experiences retain effects, or that effects are important only for those continuously living in poor environments. The results therefore pointed to the harmfulness of long exposures to concentrations of poverty (ibid.)

The neighbourhood literature has further suggested that mechanisms such as role modelling and place stigmatisation may take effect after the phenomena passes a certain threshold. This means that increasing negative impacts begin to occur for the residents of an area when the share of a group, such as low-

income residents in a neighbourhood, reaches a certain level, a 'tipping point'. The idea proposed by Galster (2001; 2008) implies that associations of neighbourhood characteristics with individual outcomes should be tested for non-linearity. Studies such as Galster and Hedman's (2013) and Ostendorf et al's (2003) enquiry appear to discover thresholds at a point where the share of low-income population exceeds around 20-30%, after which associations with individual outcomes turn negative.

### 2.2.3 **Methodological challenges**

In addition to these conceptual issues, quantitative research on neighbourhood effects has made efforts to move from finding correlations to proving causal impacts. To identify problems in the measurement of neighbourhood effects, Manski (1993) has distinguished three types of possible effects: endogenous, exogenous, and correlated effects. Endogenous effect mechanisms refer to social learning and peer effects mechanisms, which assume that individuals' behaviour or outcomes are affected by other individuals in the neighbourhood. The problem here concerns the mutual causality of individual and neighbourhood characteristics, as studies may falsely infer cause from the behaviour of individuals that constitute the group, what Manski (1993) calls the reflection problem (also Van Ham & Manley, 2013; Galster, 2008).

Second, exogenous or contextual effects imply that the behaviour of individuals is affected by exogenous characteristics of the neighbourhood or neighbours. An effect on for example school achievement might stem from the socio-economic composition of the neighbourhood. The third type of mechanism, correlated effects stem from larger structures such as the location of a neighbourhood, the quality and accessibility of services, affecting all residents or those individuals with similar characteristics. This is often the result of a prior selection of residents to the neighbourhood (Van Ham & Manley, 2010; Dietz, 2002, Manski, 1993; Galster, 2008; Hedman, 2011).

The selection of households into neighbourhoods is a common source of bias which many have argued may lead studies to over- or underestimate the effect of the neighbourhood environment (Van Ham & Manley, 2010; Galster, 2012; Sampson et al., 2002). Household sorting generally occurs as a result of labour

and housing market processes, as well as individual preferences or values. A selection effect implies that the same characteristics driving residential mobility are behind the measured outcome, and therefore this can be considered to be an endogeneity problem (Hedman, 2011; Galster, 2012). Selection can be considered as an omitted variable bias, implying that characteristics of households that are hard to measure are likely to confound the relationship between factors and the outcome (Dietz, 2002; Murnane & Willett, 2011).

As an example of selection, higher levels of educational attainment in more expensive areas can be related to family attributes, as parents who are able to invest income in moving near a good school might at the same time push their children to obtain better results. Statistical models that do not include measures pertaining to selection may end up exaggerating the neighbourhood effect (Van Ham & Manley, 2010). Summarising many studies, Manley et al. (2011) argue that the effects found in different countries are affected by residential selection leading studies to overstate the impact of neighbourhoods, which implies that residential environments tend to have a smaller impact on outcomes compared to characteristics of households. The great presence of selection problems has led authors to emphasise explanations based on income inequality and housing policies which sort poor people into disadvantaged areas (Cheshire, 2007).

To address selection, quasi-experimental studies, such as the Moving to Opportunity and HOPE IV programmes in the US, assigned participants from similar backgrounds to specific areas (Briggs et al., 2010; Popkin et al., 2007). The allocation method aimed to eliminate selection bias so that possible effects would be accountable to the experiment. However, even these types of programmes are known to not be completely free of bias, as for example participants in the MTO programme had to meet some criteria (e.g., have a car and no criminal convictions). In non-experimental studies, selection should be included in the models otherwise (Dietz, 2002; Murnane & Willett, 2011). As one way of trying to limit selection effects, some have limited their analytical samples to individuals in social housing. The argument here is that in this tenure, individuals have little or no freedom to choose the area they live in and can therefore be considered to be effectively allocated at random to the

neighbourhoods (Oreopoulos, 2003; Van Ham & Manley, 2010). To establish the direction of causality, however, many studies have relied on longitudinal research designs. As longitudinal data includes multiple measurements from the same individuals through time, they allow studies to control for neighbourhood conditions prior to the examined outcome. Unlike cross-sectional studies, this manages to avoid the potential issue of reverse causality (Van Ham & Manley, 2010; Musterd & Andersson, 2005; Musterd et al, 2003).

Quantitative researchers have summarised further econometric techniques used to control for endogeneity problems. Sibling models control for unobservable family characteristics by measuring the difference in outcomes when siblings have experienced different neighbourhoods in their childhood. Difference-in-difference models in turn try to eliminate all time-constant unobservable individual characteristics by measuring the difference in outcomes between two time points. In order to address the problems of endogeneity and selection, a few studies adopt instrumental variables. Instrumental variables are external in the way that they are correlated with the endogenous predictor, but uncorrelated with the residuals, thereby avoiding omitted variable bias (Dietz, 2002; Hedman, 2011; Murnane & Willett, 2011). Using instrumental variables involves modelling the endogenous variable in question (such as the poverty rate of a neighbourhood) on the exogenous variables that should be highly correlated with the endogenous variable, but uncorrelated with the error term (Hedman, 2011; Galster, 2008). The challenge in this approach is to find appropriate variables to function as proxies for the endogenous variable.

## 2.3 Social and tenure mix

This section turns to the literature on social and tenure mix. Mix has become a key feature of urban policy that aims to alleviate problems associated with disadvantaged neighbourhoods by diversifying the socio-economic or tenure composition of areas. Therefore arguments used to promote mixing have largely drawn on evidence from the neighbourhood effects literature. The notion of social mix gained prominence in the urban regeneration programmes implemented by the New Labour government. New Labour's initiatives were set to deliver changes in the housing stock of deprived areas in order to attract

higher-income residents, with the aim of benefitting the area and its existing residents (ODPM, 2003; 2005b; Lupton & Fuller, 2009; Kleinhans, 2004; Lawless, 2003). The assumed benefits of mix can be traced back to the social-interactive and institutional mechanisms identified in neighbourhood research. A key argument for mixing is that it would encourage social ties between socio-economic groups, and thereby lead to improved aspirations and economic outcomes for low-income residents. Social-interactive mechanisms are further seen to accrue indirect benefits to an area's service provision. The introduction of higher-income residents is assumed to increase levels of social capital and collective efficacy, allowing for residents to advocate for improvements in local services (Lupton & Tunstall, 2008; Bond et al., 2011). In addition, mix can have indirect effects on some of the institutional mechanisms, with the potential to improve perceptions of the area held by service providers and institutional actors, while also attracting private services through increased income levels (Galster, 2012; Atkinson & Kintrea, 2000; Bond et al., 2011).

This section will begin with an introduction of the background of social mix policies in the UK (2.3.1). Section 2.3.2 highlights how the development of mixed areas has centred around tenure diversification, where efforts have focused on the promotion of owner-occupation in low-income areas. Section 2.4 focuses on social capital and collective efficacy as key concepts underlining the arguments for social mix.

Following the discussion on neighbourhood effects (section 2.1), section 2.5 turns to the evidence on the outcomes related to the social-interactive and institutional mechanisms as a result of mixing in. The scope of research on social mix extends to various outcomes in housing and the physical environment (Baum et al., 2010; Bond et al., 2013), local services (Jupp, 1999; Kearns & Mason, 2007), health and wellbeing (Ellaway et al., 2001; Rowan, 2015), education (Robison et al., 2016), crime (Sampson et al., 1997), neighbourhood reputation (Dean & Hastings, 2003), and the employment and social mobility of individuals (Bailey et al., 2007; Musterd & Andersson, 2005; Van Ham & Manley, 2009). However, this section narrows the discussion on outcomes related to social mobility and local services, which were placed at the centre of New Labour's policy agenda.

### 2.3.1 Social mix policies

Mixed tenure has been a strong feature of urban policy in the UK since the 1990s and gained particular prominence in the policies of the New Labour government (1997-2010). The concept of mixed communities in the UK can be traced back to the New Town programmes in the post-war period, where the idea of 'social balance' in terms of social class was integrated in the planning of new housing estates (Cole & Goodchild, 2001). However, tenure diversification as a means to address problems arising from concentrations of disadvantage began to develop in the 1970s with policies focusing on the dilution of social housing. The major English council estate improvement scheme of the late 1980s and early 1990s, Estate Action, integrated tenure mixing as an explicit goal. Since then, tenure diversification has been approached by building homes for sale or for shared ownership into areas dominated by social renting, while a number of low-cost home-ownership schemes have been introduced (Monk et al., 2011; Cole & Goodchild, 2001). The most wide-spread policy promoting home-ownership with the aim of tenure diversification has been the Right to Buy, launched in the 1980s, allowing council tenants to acquire their homes (Tunstall & Fenton, 2006). Right to Buy has however had limited success in diversifying the social composition of neighbourhoods. In fact, it is said to have led to a polarisation between 'desirable' estates where higher proportions of houses have been sold, whereas sales in undesirable and potentially stigmatised estates have been lower (Cole & Goodchild, 2001; Wood, 2003).

The promotion of social mix was explicit in the many neighbourhood renewal initiatives of the New Labour government. The 'flagship' regeneration programme New Deal for Communities was launched in 1998 and aimed to turn deprived areas into mixed communities (Batty et al., 2010; Lupton et al., 2013a; Lupton & Tunstall, 2008). Housing tenure mix was particularly part of the New Deal for Communities, which highlighted the challenge that deprived areas face of trying to increase levels of home ownership and provide attractive residential areas. Later, the Mixed Communities Initiative set out to convert the composition of all social housing estates into mixed tenure by 2012 (ODPM, 2005b; Lupton & Tunstall, 2008). Developing areas with mixed tenures and incomes was assumed to improve the social integration of disadvantaged

neighbourhoods as a response to outcomes in housing, health, crime, and education in disadvantaged areas in England (SEU, 2001; UTF, 1999).

Scottish Planning Policy also recognised the need for social mix, which would contribute to self-sustaining and socially diverse communities. Planning policy refers to mixed areas as being "more diverse, attractive" and mix is understood "in terms of tenure, demographic and income." (Scottish Government, 2008, para. 80). The Scottish policy related mix to the need for affordable housing, and recommends that new developments should allocate 25% of the total number of units as affordable housing (ibid, para. 94.). The requirement for new developments of a certain size to include an element of mix as an amount of affordable housing continues to be in place. The more recent housing strategy plan of the Government further aims to provide support for all tenures in order to promote choice within the housing market, while encouraging mixed tenure (Scottish Government, 2011).

### 2.3.2 **The role of tenure in mix policies**

Initiatives recommending mix have aimed to modify the tenure and socio-economic composition of areas so that the terms mixed tenure and mixed income are often used interchangeably (Rowlands et al., 2006; Tunstall & Fenton, 2006). The aim of housing and planning policies is to introduce mixed house and tenure developments with the intention to produce a wider range of incomes in an area (Fenton, 2010; Rowlands et al., 2006; Monk et al., 2011). The aim of creating income mix is often achievable through tenure mix, and it has been shown that mixing tenures reduces the concentrations of poverty and diversifies income levels in an area (Rowlands et al., 2006; Tunstall & Fenton, 2006). However, it should be noted that tenure categories do not neatly coincide with income groups, which may alter the resulting levels of social mix that tenure mix hopes to achieve. Introducing owner-occupation (the common way of delivering mix) into an area is likely to increase income levels as owners tend to have more resources, but owners have varying levels of income and all owner-occupiers do not fall into the higher categories of socio-economic status. This also depends on the housing market and area, so that deprived areas with lower house prices will attract owners from lower income groups (Rowlands et al., 2006). More recent developments and changes in tenure

structure include the expansion of the private rented sector, which together with the residualisation of social renting has meant that more low-income households who previously may have been eligible for social housing are now private renters (Rowan, 2015).

The strategies in housing and urban policy to create mixed communities can be classified under three categories. Dilution strategies imply the reduction of social housing, as under the Right to Buy, or by selling land to private developers to build homes in housing estates. Second, some diversifying strategies aim to include social rented houses in new developments. Finally, so-called dispersal strategies use various policy instruments to relocate the residents of deprived areas. This has been popular in the US whereas the two former more so in Europe (Kearns & Mason, 2007; Monk et al., 2011; Fenton, 2010). Social mix initiatives in the UK have predominantly focused on diluting concentrations of social housing by increasing in situ levels of homeownership (Monk et al., 2011). Critics have pointed out that mixed communities have mostly been targeted to low-income areas, while mixing has not been forced on middle or high-income areas (Kearns & Mason, 2007; Lupton & Fuller, 2009; Lees, 2008).

Researchers have argued that home-ownership has rather uncritically become the preferred tenure in regeneration policy (McIntyre & McKee, 2009; Rowan, 2015; Ruming et al., 2004). The promotion of home ownership was also manifested in the intention of New Labour's mix policies to create more sustainable residential areas by providing housing for different types of households (ODMP, 2003; SEU, 2001). At the same time, a number of low-cost home-ownership programmes were promoting home-ownership for low-income households (McIntyre & McKee, 2009). During the same time, the Scottish Government also consistently aimed to increase the owner-occupied sector through initiatives including changes in the housing stock of low-income areas and the expansion of home-ownership schemes, which are said to have contributed to the normalisation of owner-occupation as the preferred tenure (Scottish Government, 2007; McIntyre & McKee, 2009; Rowan, 2015).

The arguments for the benefits of mixed tenure compositions can therefore be said to have largely relied on the positive influence of owner-occupiers. The

notion of sustainability cited in policy texts has been interpreted as the financial commitment and resources of home-owners, which would allow areas to better sustain services. Sustainability also relates to community stability, which low-income housing estates are seen to lack due to their higher turnover rates (Tunstall & Fenton, 2006; Lupton & Fuller, 2009; Kearns et al., 2013; Kleinhans, 2004).

Further, arguments recommending social mix generally cite the benefits of owner-occupiers to individuals' economic outcomes, as is discussed in the following sections. In line with the theory on neighbourhood effects, it is suggested that owner-occupiers would act as role models to raise aspirations regarding employment and education, and influence attitudes regarding the area and collective action. Importantly, mixed tenure is assumed to increase levels of social capital and collective efficacy through the introduction of middle-class home-owners, who these characteristics are more generally attributed to (Tunstall, 2003; Lupton, 2003; Lupton & Fuller, 2009; Kearns et al., 2013; DETR, 2000).

The promotion of owner-occupation has occurred at the same time as the state provision of housing has been radically reduced and become a marginal form of tenure. A central underlying logic in the preference for owner-occupation over social renting is however a shift away from state intervention in the provision of housing. McIntyre and McKee (2009) argue that this policy direction has moral connotations. As the social housing sector has become 'residualised' and caters to more vulnerable and economically inactive residents, social housing has been problematised as passive dependency on the state and the management of housing estates is seen as increasingly more challenging (ibid; Cole & Goodchild, 2001; Manzi, 2010). Thus, neighbourhood regeneration has involved not only physical improvement of housing estates, but an inherent idea about transformation of residents themselves, who would become more self-regulating and adhere to middle-class homeowners' values. This can be seen as the influence of the 'cultures of poverty' discourse in the policies, and the logic sits with the government agenda of responsibilisation of individuals and communities for their economic outcomes (Manzi, 2010; Cole & Goodchild, 2001). Home-owners are seen as active citizens who have taken responsibility for their well-being, through work and the ability to consume services, without

the involvement of the state. The mixing of tenures mainly through the introduction of owner-occupiers would therefore raise aspirations, and encourage responsible behaviours and self-governance in low-income areas (McIntyre & McKee, 2009; Rowan, 2015; Kearns et al., 2013).

## 2.4 Social mix and social capital

The social-interactive mechanisms identified in neighbourhood research are closely tied to the concepts of social cohesion, social capital, and collective efficacy. Particularly social capital and collective efficacy have become prominent in the arguments for social mix. The efforts of the New Labour government focused on creating more cohesive communities, and highlighted the role of social capital as a tool for improving economic outcomes for individuals and communities (Kearns, 2003; Lupton & Tunstall, 2008). Social cohesion is sometimes used as an umbrella term to refer to the social networks and social capital in a community, and often referred to in policy with some lack of clarity of its definition (ODPM, 2003; Forrest & Kearns, 2001). Cohesion is considered to consist of the shared values, social order, community participation, and the ability to cooperate among residents in a neighbourhood (Forrest & Kearns, 2001). Cohesive neighbourhoods tend to also foster social networks and forms of social support among neighbours, which in turn may encourage participation in community organisations and advocacy for common issues (Perkins et al., 1996; Forrest & Kearns, 2001; DeFilippis, 2001). Policy texts have further linked the importance of higher levels of social capital to participation in community organisations, through which communities could work together to influence local service provision (ODPM, 2005b; Scottish Executive, 2002b; 2006).

### 2.4.1 Theories of social capital

Widely known theories on social capital have come from Bourdieu, Coleman and Putnam. Bringing social capital into the centre of policy discourse, Putnam (2000) applied the concept to institutional performance and corresponding levels of civic engagement. Putnam's definition of social capital refers to trust, social networks, and norms within an institution that can facilitate cooperation and ultimately improve the efficiency of a society. It contributes to collective

action among other things by fostering norms of reciprocity and facilitating information flows between individuals and groups (Putnam, 2000; Field, 2008; Temkin & Rohe, 1998). Key to Putnam's definition of social capital is that it is attributed to the functioning of cities, states, or regions, although it can also exist at lower scales (Field, 2008; Völker et al., 2007; DeFilippis, 2001).

Putnam distinguished two types of social capital. He considered bonding type of social capital to occur between people who are alike in terms of for example ethnicity or socio-economic status, while bridging capital brings together people from different backgrounds and communities. Bonding refers to strong interpersonal ties and mutual social support. Some authors have raised concerns that strong social ties within a community can impose restrictions on their members (Portes, 2014). The argument has been applied in support for widening social networks in disadvantaged communities, which have often been found to host more bonding capital. It is considered that residential communities with tight bonds may restrict individuals from some benefits, such as job opportunities, and constrain their ties outside the local community. People who are disadvantaged in terms of income and education can be held back by their networks if they are made up of people in similar situations, who may equally lack resources to help (Field, 2008; Pinkster, 2017; Forrest & Kearns, 2001).

Bridging capital in turn relates to the development of weak social ties, which are said to be useful for accessing goods and information (Granovetter, 1983). Putnam (2000) places importance on these weak ties, arguing that associations with relative strangers allow people to achieve cooperation and generalised trust rather than close ties of kinship. Therefore, Putnam's definition of social capital and organisational life considers weak, bridging ties as a potential resource for communities in the framework of economic competitiveness. For this reason, regeneration policies have favoured the building of bridging capital in order to ameliorate the position of disadvantaged neighbourhoods (DeFilippis, 2001; Forrest & Kearns, 2001).

Related to bridging, a third type of social capital is linking capital. Linking capital refers to 'vertical' ties between individuals and communities to those in powerful positions or working in formal organisations – such as service

providers and decision-makers (Halpern, 2005; Woolcock & Deepa, 2000; Groves et al., 2003). The importance of this type of capital emerges in relation to communities' ability to influence service providers and have a say in the delivery of neighbourhood services. These relationships and forms of participation were promoted by the UK government's neighbourhood renewal programmes, as will be discussed in section 3.4. Considering linking capital as a tool in community development, Purdue (2001) among others contends that influencing decision-making requires relationships of mutual trust and respect between community organisations and representatives of local authorities (also e.g. Burton et al., 2004).

While interested in educational inequality, Coleman placed social capital in the framework of rational action theory, which assumes that individuals tend to pursue their own interests. He found that communities were a source of social capital that could offset some of the impact on a pupil of social and economic disadvantage within the family. Coleman's view combines individual and collective definitions of social capital. He defines social capital as the resources, obligations, and norms available to an individual through their social relationships. Relationships promote capital resources as they build trust and obligations between actors. Its creation is facilitated by 'closure' between networks; the existence of mutually reinforcing relations between actors and institutions which imposes obligations and sanctions. For Coleman, social capital is a public good, which allows it to benefit the whole of a community. This collective perspective means that neighbours can benefit from higher levels of capital without themselves having social ties to neighbours (Coleman, 1988; Field, 2008; Völker et al., 2007).

In turn, Bourdieu takes an individual perspective on social capital which is 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition' (Bourdieu 1986, p. 248). Bourdieu's definition draws on social capital as means of accessing resources of status and privilege at the expense of others in the reproduction of social inequality. His theory has been largely applied in educational research, as Bourdieu saw education as a key channel through which privilege is passed on. Social capital works as currency that is traded in order to get certain assets or supports, such as

leverage for a political career. However, the value of an individual's ties depends on the number of connections they can mobilise. Further, ties must be durable and mutual in order to draw benefits, meaning both agents must recognise the tie and invest in it to maintain them (ibid.; Field, 2008).

The other forms of capital in Bourdieu's theory are economic and cultural capital. Cultural capital refers to the knowledge, taste and practices of an individual, which function as a mark of distinction in the social structure. A key attribute of the forms of social and cultural capital is that they can be converted into economic capital, and vice versa. Social capital in the form of contacts with well-positioned individuals can lead to information about jobs and thereby increase one's economic capital. In turn, cultural capital can, to some extent, be accrued by having more economic capital as this allows access to facilities and cultural goods. The forms of capital are considered assets that individuals gather and that determine their position in the fields of the respective capitals. Bourdieu especially draws attention to the embodied cultural capital and language as means of communication and presenting oneself in an appropriate way for example in relation to officials (Bourdieu, 1986; Field, 2008). Researchers have asserted the role of cultural capital in regard to service provision, where cultural capital functions in the favour of middle-class individuals allowing them to engage with service providers and be perceived in a more positive way by officials (Hastings & Matthews, 2015). This discussion will be returned to in section 3.3.

The definitions of social capital based on Putnam's and partially Coleman's work have been widely adopted in policy. Arguments that relate problems of lower-income neighbourhoods to their lack of social capital tend to focus on increasing levels of formal participation, such as volunteering, voting, and organised collective action, following Putnam's favoring of bridging type of capital (Halpern, 2005; Johnston et al., 2005; Subramanian et al., 2003). The social mix policies of New Labour considered that building bridging social capital and networks across tenure groups would lead to better outcomes in social mobility (Lupton & Tunstall, 2008; Kearns, 2003).

Research has found that neighbourhoods with more educated, higher-income individuals, and owner-occupiers, tend to be associated with having more

bridging type of social capital (Kleinhans et al., 2007; Saegert & Winkel, 2004; Völker et al., 2007; Temkin & Rohe, 1998). Similarly, linking capital has been found to be more prevalent in affluent neighbourhoods (Groves et al., 2003). However, studies have pointed out that neighbourhoods may host different forms of social capital which may not be captured by measures focusing on formal associations (Twigg et al., 2006). Research by Twigg and colleagues (2006) observed that formal, organised activities were more popular in higher-status areas which tend to, in turn, have lower levels of informal sociability. Examples of formal social capital are neighbourhood associations, types of community advocacy, and school-based associations (idid.; Perkins & Long, 2002). In turn, the study supported the assumption that low-income areas host more informal social capital in the form of close family ties and mutual support (Twigg et al., 2006; Briggs et al., 2010), although other studies contest that the levels of informal or 'neighbourly' sociability and support are higher in disadvantaged areas (Swaroop & Morenoff, 2006; Bailey et al., 2015).

Studies conducted within deprived communities have argued that the policy focus on increasing bridging capital tends to equate social capital and cohesion with higher levels of formal participation (McKenzie, 2015; Mugnano & Palvarini, 2013; Feeney & Collins, 2015). The implication that disadvantaged areas lack social capital also ignores barriers to participation and collective action, which can be derived from economic resources, skills, and education (Lister, 1998). This can lead to undervaluing the types of social capital present in deprived areas, but research has asserted that types of informal social capital, including social support, serve a function in enabling people to better cope with poverty, unemployment, and social exclusion (McKenzie, 2015; Lister, 1998). Further, these existing forms of social capital present in low-income neighbourhoods can equally contribute to the social cohesion of areas (McKenzie, 2015; Mugnano & Palvarini, 2013; Feeney & Collins, 2015).

### 2.4.2 **Collective efficacy**

A form of social capital, collective efficacy refers to residents' willingness to intervene for the sake of common good in a neighbourhood and the ability to collectively address issues. Sampson and Earls (1997) originally defined the term particularly in relation to social order and crime prevention in their study

of social disorder in Chicago neighbourhoods. Collective efficacy occurs when residents share expectations of acceptable behaviour and are willing to engage in social control. It permits a community to exert social control as the 'capacity of a group to regulate its members […] to realize collective […] goals' (Sampson et al., 1997, p. 918). Examples of this are monitoring children on playgrounds or intervening in disturbing behaviour (ibid.).

The argument behind social mix asserts that the presence of higher-income residents and home-owners will promote norms and common values that lead to more informal social control, helping to prevent crime and antisocial behaviour (Sampson et al., 1997; Sampson et al., 1999). The social disorder theory, mentioned in regard to neighbourhood effects (section 2.1.1), has supported the assumption that levels of collective efficacy are lower in neighbourhoods with concentrations of disadvantage. Research has contended that levels of cohesion and social control tend to be undermined by resource deprivation and alienation, as residents are more likely to express fear of crime, mistrust, and perceptions of powerlessness (Sampson et al., 1997; Swaroop & Morenoff, 2006). However, research has produced some mixed evidence in regard to this. Swaroop and Morenoff (2006) discovered that neighbourhoods that experienced more disorder had higher rates of participation, and this was related to the social need for local associations as a result of social isolation and physical deterioration of the neighbourhood. In line with the arguments for bridging capital, authors have considered that in order to exert social control, communities need weak ties to foster mutual trust and solidarity rather than strong interpersonal bonds, which are more prevalent in disadvantaged areas (ibid.; Forrest & Kearns, 2001). However, Kleinman (2000) notes that social order in better-off areas does not necessarily stem from community spirit or close interpersonal ties. While less deprived areas are likely to have less need to engage with crime and disorder, a 'moral minimalism' may also be at work, a concept developed by Baumgartner (1988, in ibid.), where order and civility stem from indifference and isolation.

Collective efficacy is also understood as local organisational behaviours and the ability to engage in collective action (Carrière, 2016; Perkins & Long, 2002; Swaroop & Morenoff, 2006). In their study on the influence of the neighbourhood context on participation, Swaroop and Morenoff (2006)

classified forms of neighbourhood social organisation. They termed 'instrumental participation' formal activities which stem from political concerns of residents to for example promote local businesses and protect community assets, which can be understood as collective efficacy. Challenging the common assumption on low political participation in poor areas, the authors found this type of participation to be more prevalent in disadvantaged areas (ibid.). Collective organisation has been found to be supported by informal neighbouring behaviours. Some have found participation in community organisations to be associated with social interactions and social support between neighbours, as these can lead to more community-oriented behaviours and attitudes (Perkins et al., 1996; Dekker, 2007). While efficacy is supported by participation in local organisations, participation can also be considered a result of efficacy, as perceptions of the efficacy of collective action are likely to encourage involvement in a community (Perkins & Long, 2002; Perkins et al., 1996).

Collective efficacy is further contingent on residential stability, which is required for social networks and social capital to develop between residents. Sampson (1988) has concluded that community stability is associated with social participation and local friendships, and allows the community to work together with public control (e.g., the police) to achieve social order. The presence of home-owners as stable residents is associated with increased collective efficacy, as they are more likely to be invested in their community and considered to have made a long-term commitment to staying in the area. As social ties are formed over longer time periods, the potential for social control can be undermined in disadvantaged areas that have high residential turnover rates (Sampson et al., 1997; Bailey et al., 2012; Pinkster, 2007). Considering the impacts of resource deprivation and turnover on social cohesion and social control therefore highlights that a lack of collective efficacy in deprived urban areas is not merely a question of social capital.

Collective efficacy became a policy emphasis in New Labour's regeneration strategy under community empowerment, which mainly referred to the idea that communities should be given more responsibility for their local services, along with the shift towards making services more responsive to the public. It was also intended for communities to work in partnerships with public and third

sector service providers (e.g., Lupton, 2003; Needham, 2007). Later sections will return to this discussion.

## 2.5 Impacts of social mix

This section overviews research on the expected outcomes of social mix policies. The neighbourhood renewal agenda of New Labour emphasised that outcomes in social mobility and employment could be improved for residents in disadvantaged areas by developing broader social networks and community cohesion (Lupton, 2003; Kearns, 2003). A further key aspect in which social cohesion would be beneficial was the improvement of local services through various mechanisms, including residents' collective influence (ODPM, 2005a; Joseph, 2006; Kearns & Mason, 2007). Therefore the discussion first overviews some previous findings on the impact of social-interactive mechanisms on individual outcomes in section 2.4.1. Section 2.4.2 consequently discusses whether mixing is successful in producing social interactions. Finally, section 2.4.3 reviews outcomes in local service provision found in social mix studies.

### 2.5.1 Outcomes from social-interactive mechanisms

Support for social mix stems from the view that concentrations of disadvantaged households reinforce problems of exclusion, which is the focus of research regarding neighbourhood effects discussed in section 2.1. A key aspect in the policy of New Labour was that mixing tenures would improve opportunities for social mobility for low-income residents through the broader social networks and social capital of higher-income owner-occupiers, who can be referred to as middle-class residents (SEU, 2001; Lupton, 2003; Levitas, 1998). However, while there is not a great amount of detailed research on resident interactions, the research is particularly inconclusive as to positive outcomes from the social-interactive aspects of mix (Manley et al., 2011; Sautkina et al., 2012; Bond et al., 2011).

The social networks argument is used to justify the development of mixed areas based on benefits for low-income residents gained from networking with residents from middle-class backgrounds. The argument posits that mixed areas would allow for low-income residents to form connections with more

affluent residents in order to obtain information about employment opportunities and other resources, whereas in low-income social networks tend to be more restricted. This argument refers to the formation of weak ties, a notion stemming from the work of Granovetter (1983). Weak ties consisting of acquaintances can enhance individuals' opportunities to advance their economic outcomes and 'get ahead', and the notion is therefore allied with the concept of bridging capital defined by Putnam (2000). In turn, strong ties refer to close personal relationships, similarly to Putnam's bonding capital. These are often seen to be more prevalent in deprived neighbourhoods and tend to provide forms of social support and therefore help individuals to 'get by' (Forrest & Kearns, 2001; McKenzie, 2015; Livingston et al., 2010).

Researchers have argued for the importance of weak ties for the social inclusion of disadvantaged residents, as more diverse relationships are perceived to provide access to more varied types of information and different resources (Granovetter, 1983; Kleit, 2001). It is considered that if job opportunities and chances of 'getting ahead' are limited in deprived areas if residents' network consists of people with working-class or low-skilled jobs. Critical writers have however acknowledged that weak ties are not sufficient means to guarantee access to employment to jobseekers or those with working-class jobs. Interactions tend to be more influential among residents with similar socio-economic backgrounds, meaning that those in higher-status jobs will share information with others in similar positions. This also implies that information passed on from residents in professional occupations about jobs may not necessarily be relevant to workers who do not have similar qualifications or occupational backgrounds (Cheshire, 2007; Kleit, 2001; Kearns & Mason, 2018).

The social relationships of individuals in low-income neighbourhoods have been found to be more localised than in affluent areas (Fischer, 1982; Briggs et al., 2010; Curley, 2010), which can make their available job networks more homogenous, whereas individuals with higher-status jobs and higher incomes tend to have more widely dispersed networks partly because their resources allow more mobility (Kleit, 2001; Fischer, 1982). Researchers and policy-makers have further raised concerns that strong ties in disadvantaged communities can be burdensome (through for example caring responsibilities)

and constrain individuals' social mobility (Forrest & Kearns, 2001; Briggs et al., 2010), although the perspective viewing strong ties as a negative resource has been contested by some studies (McKenzie, 2015; Feeney & Collins, 2015).

The effect of social network mechanisms on individual outcomes has been addressed perhaps most convincingly by quasi-experimental studies that seek to tackle one of the challenges of neighbourhood effects studies, selection, by assigning some participants to low-poverty areas and others to remain in high-poverty areas. In this way, effects of the intervention should be attributable to the relocation and thus neighbourhood. The relocation approach has been popular in the US since the 1990s, and the Moving to Opportunity (MTO) was an experimental research programme designed to examine the effects of a relocation intervention beginning in 1994 (Briggs et al., 2010; Rosenbaum & Zuberi, 2010).

The programme was carried out on public housing residents in five cities who lived in neighbourhoods with poverty rates of 40% or more. Participant families were randomly assigned to either a control group, comparison group, or an experimental group. The experimental group was given a voucher to use in a low-poverty neighbourhood and received assistance in their relocation. The control group remained in public housing and the comparison group received counselling and a voucher for the private market. The experimental group received no counselling after their placement and the only locational restriction was to remain in the new location for a year. However, the study did not completely avoid selection. Families who were chosen had to pass eligibility criteria, including not having rent arrears or a criminal record, and those who successfully moved were more likely to be in adult education and own a car (Briggs et al., 2010; Rosenbaum & Zuberi, 2010).

The MTO experiment aimed to improve social mobility for its young participants. However, the results from the experiment challenged the mechanisms relating to socialisation and role modelling, as the programme did not appear to support the social mobility of participants through new social contacts. Adults and youth in MTO had difficulty adjusting to their new neighbourhoods and expectations of behaviour, or resisted fitting in, which reflected social boundaries of race and class (Briggs, 1997 in Briggs et al.,

2010). This confirms arguments that find role modelling to be ineffective across social boundaries in mixed neighbourhoods (Sautkina et al., 2012; Atkinson & Kintrea, 2000).

Dispersal programmes overall have been criticised for their failure to connect residents to jobs and other structures (Cheshire, 2007; Curley, 2010). The effectiveness of social mix in improving the position of disadvantaged individuals has been put into question in light of structural barriers to social mobility, particularly in the context of low-wage work and poor transport (ibid.; Kearns & Mason, 2018). Within the MTO study, relocation on its own could not guarantee employment without additional assistance, as many were unable to work due to chronic illness or needing childcare. Some improved their position by new housing locations with better access to jobs, nevertheless, relocating did not mean moving to a job-dense area and many entry-level jobs seemed to be localised (Briggs et al., 2010).

### 2.5.2 **Social integration or segmentation?**

The social networks approach has been widely criticised as the outcomes from interaction between tenure groups have not been evident (Cole & Goodchild, 2001; Cheshire, 2007; Kleinhans, 2004; Lees, 2008). Mix relies on the idea that the physical integration of socio-economic groups may help to create interaction or 'mixing' and neighbourly relations among residents from different socio-economic backgrounds or with varying income levels (Jupp, 1999; Kleit, 2005). Some have criticised this as a form of 'social engineering' contending that mere physical proximity of groups does not produce social interaction, as different socio-economic groups remain disassociated (Graves, 2010; Jupp, 1999; Atkinson & Kintrea, 2000; Bretherton & Pleace, 2011).

At least two case studies (in Glasgow's New Gorbals and Bournville, Birmingham) have found that physically integrated estates were relatively successful in creating social mixing between tenures whereas tenure-segregated estates were the least successful (Kearns et al., 2013; Groves et al., 2003). However, various mixed estates in the UK have not been successful in the social integration of owners and tenants. In Jupp's (1999) case study, tenure mix failed to create much community spirit or extensive cross-tenure

networks. Reports from the MTO study have contended that few of the relocated social housing tenants reported close interaction with more educated, higher-income residents although the areas were found to be more safe and efficient in supervising young people. Tenants who were relocated as part of tenure diversification projects preferred to maintain networks and social ties with friends and family in their old neighbourhood (Briggs et al., 2010).

Aspects of the local facilities and management practices can mediate social relations among residents. Some studies have concluded that local facilities, community organisations, and housing managers might help in building community networks and trust among residents, while mediating possible neighbour disputes (Jupp, 1999; Nast & Blokland, 2014; Curley, 2010; Tersteeg & Pinkster, 2015; Bretherton & Pleace, 2011). Local facilities as public spaces can provide spaces for interaction between residents and increase trust in others through gained familiarity (Curley, 2010). Particularly schools and children's activities are found to foster contact between tenure groups through a shared life stage (Jupp, 1999; Nast & Blokland, 2014). Some have found that community centres and local organisations are effective in bringing residents together and act as opportunities for relationships to form, although their use might be limited to a minority of residents (Chaskin & Joseph, 2010; Jupp, 1999; Mugnano & Palvarini, 2013). The role of physical and institutional contexts in delivering effective mix from this perspective seems under-researched (Tersteeg & Pinkster, 2015).

It has been suggested that mixed areas can even increase divisions between tenures and socio-economic groups (Graves, 2010; Arthurson, 2010; Ziersch & Arthurson, 2007). A number of studies have pointed out that owners may be more apprehensive towards social diversity and tend to hold negative perceptions of social renters (August, 2014; Blanc, 2010; Wood, 2003; Baum et al., 2010). Examining socio-economic mix and neighbourhood satisfaction, Baum et al. (2010) state that the levels of satisfaction with the neighbourhood decreased among homeowners as income or tenure mix increased. As the result did not hold for social tenants, this is regarded as a 'NIMBY' ('not in my backyard') attitude from home-owners. A few studies have reported owners to express concerns about living near renters and had negative images of them

(Jupp, 1999; Beekman et al., 2001; Groves et al., 2003; Bretherton & Pleace, 2011; Ziersch & Arthurson, 2007). Negative perceptions are often a response to problems such as vandalism or noise, but in some instances they can reflect preconceived images of social renters. Beekman et al. (2001) observed tensions between tenures in 10 case studies in Scotland, finding that owners perceived tenants as causes of problems, regardless of evidence of this.

The evidence suggests that the attitudes of owners reflect the 'underclass' discourse, as they stem from the perceptions of other residents' values, lifestyles, and behaviours (Chaskin & Joseph, 2010; Manzi, 2010). With the residualisation of social rent as tenure and the concentration of social problems in the sector, studies have noted that social housing tenants have been associated with anti-social behaviour, lack of care for their property and lack of commitment to the community (Arthurson, 2012; McIntyre & McKee, 2009; Palmer et al., 2007).

The notion has filtered into the management practices in mixed communities, which are thought to need intensive social management in order to succeed (Tunstall & Fenton, 2006; Graves, 2010; August, 2014). Discussions on social management and controlling behaviour have according to Manzi (2010) focused rather exclusively on social housing tenants. The study conducted by Graves (2010) in a mixed-income area in Boston found that those in private tenures and social renters held differential status vis-à-vis housing managers, who tended to favour market-rate owners and renters by restricting social renters' children's outdoor playing (Graves, 2010). Those who pay higher (market-rate) rents or own their homes are likely to have greater leverage regarding management, whereas social renters or subsidised renters rarely have the option to leave neither do they have the leverage to threaten to do so. This highlights the ways in which management practices can play a role in the social integration of tenures, while in some cases act to implicitly disfavour social renters in mixed communities.

In summary, critics have argued that tenure has been afforded too large a role in the development of socially cohesive communities and consequently, tenure mix may not succeed as a policy tool in delivering socially integrated communities (e.g. Wood, 2003: McIntyre & McKee, 2009; Jupp, 1999; Lees,

2008). It appears that policy makers have given little thought to how advantaged and disadvantaged groups will interact within socially engineered mixed neighbourhoods (Galster, 2007a). As discussed, studies have contended that factors related to lifestyle and life cycle stage appear to be more crucial compared to tenure in producing social networks and cohesion in neighbourhoods (Graves, 2010; Arthurson, 2010). The creation of social ties across tenures is also undermined by the tendency of particularly higher-income groups to undertake activities and engage in social networks outside the local area (Atkinson & Kintrea, 2000).

### 2.5.3 Outcomes in local services and amenities

Studies have argued that mixing provides advantages for residents in disadvantaged areas through its impact on service provision and the physical environment, and that this aspect is more important than potential benefits in community cohesion (Ruming et al, 2004; Joseph, 2006; Joseph & Chaskin, 2010).

Evidence has discovered improvements in neighbourhood amenities after regeneration and changes in tenure structure, although studies are somewhat inconclusive as to how the presence of owners affects levels of service provision (Groves et al., 2003; Jupp, 1999; van Beckhoven & van Kempen, 2003). Residents in redeveloped areas in Glasgow reported more positive perceptions of local amenities compared to residents in older, peripheral housing estates (Bond et al., 2013). The improvements in this case study emerged as part of large area regeneration programmes, which involved large-scale investment in public and private services (ibid.).

In line with common policy aim to attract higher-income residents to inner city areas, the key arguments for mixed development generally rely on assumptions around the impact of home-owners, despite there being conclusive evidence on the advantages of increased homeownership in low-income areas (Joseph, 2006; Joseph & Chaskin, 2010; Arthurson et al., 2015). The arguments concerning service provision relate to the market and political influence of higher-income residents. The economic demand argument refers to the spending power of middle-class home-owners, which would help to attract

private services and commercial developments (Joseph, 2006; Atkinson & Kintrea, 1998; Cole & Goodchild, 2001). Secondly, the argument centring on middle classes' cultural capital implies that higher-income households are found to engage with services more to advocate for improvements, while service providers tend to also be more responsive to middle-class demands (Matthews & Hastings, 2015; Hastings et al., 2014; Gal, 1998). The third mechanism relates to social capital and collective efficacy, proposing that the presence of middle-class residents would promote community engagement and collective willingness to influence service provision (Sampson et al., 1997; Joseph & Chaskin, 2010). The mechanisms around middle-class influence are further detailed in the literature review on local services (Chapter 3).

While there is not a great amount of research on the cultural and political influence of owner-occupiers in mixed areas, some studies have found that differences in regard to standards that residents expect from their local services are associated with tenure form, lending some support for the argument about home-owners higher expectations and demand. Case studies in mixed areas have observed that owner-occupiers wish to have more say in local amenities, and are more prone to report need for improvements in services (Groves et al., 2003; Jupp, 1999; Kearns & Mason, 2007; Clark & Kearns, 2017).

Further studies have found that tenure groups also tend to differ in the types of services they use, which is reflected in their wishes for local amenities. In examining the physical context of a mixed area, Tersteeg and Pinkster (2015) discovered that the use of neighbourhood amenities was divided between home-owners and renters. Owners were happier to use local cafes, restaurants, parks, whereas social renters felt these were not facilities they could use and wished for less expensive amenities. Similar findings have emerged from the large Glasgow study, where social renters in a mixed area wished for improvements in local amenities for children and young people, whereas owners prioritised local shops, restaurants and pubs (Clark & Kearns, 2017).

Evidence on the different patterns of consumption and mobility also questions the assumption that the introduction of middle-class residents benefits the local services of lower-income neighbourhoods. The daily activity patterns of

owners and renters in mixed developments have been found to differ, so that social renters' activities tend to be more concentrated in the local area (Atkinson & Kintrea, 2000; Pinkster 2007). Research has established that middle-class households tend to spend money outside the local area, as they are more likely to work and take part in leisure activities in other neighbourhoods (ibid; Sampson, 2018). In addition, households with more resources are able to select themselves into areas with desirable services and in this way seek areas that support their lifestyles. Middle-class residents may also choose to avoid the local neighbourhood in their daily routines, which can be understood as disaffiliation from an area they wish not to identify with (Pinkster 2007; Atkinson, 2006; Blanc, 2010).

The assertiveness of middle-class residents in relation to service standards has raised concerns about their influence on the service structure of neighbourhoods. Research in gentrifying neighbourhoods has evidenced that local service provision tends to correspond to the needs and wishes of the residents with higher social, economic, and cultural capital (Lees, 2008; Tersteeg & Pinkster, 2015). The impact of middle-class demand on service provision has however not been widely studied in the context of socially mixed neighbourhoods. The next section turns to discussing issues in the geographical distribution of local services and returns to the question of class influence in section 3.3. A summary of the literature review is provided in 3.6.

# 3 Local services and social welfare

The previous Chapter discussed local services as a part of the neighbourhood context that policy has tried to address through developing social mix. This Chapter further places local services within the context of debates about social justice and the uneven geographical distribution of resources.

The focus of this research is on local services, referring to public and private services distributed in small areas. While a large part of the literature has focused on the geography of public services, many private services can be considered important for social inclusion of citizens as part of the neighbourhood context (e.g., Bramley & Besemer, 2011). Further, private services are similarly affected by issues such as constraints from unavailability, while the use of private services is more likely to involve costs, adding a potential barrier for many households.

The Chapter begins with an overview of the UK literature around public services, where it outlines the importance of public services in social welfare and redistribution, the principles that are used in the resource allocation of services, and the standards of equalisation which pertain to the geographical distribution of services (section 3.1). After this, the discussion turns to the research evidence around the access to and quality of local services with a focus on the significant disadvantages for low-income areas (section 3.2). As the literature on social mix revealed, policy initiatives have addressed local service provision partly through tenure diversification and the introduction of home-owners. This chapter will also extend the knowledge on how middle-class residents might influence local service provision by discussing evidence around the systematic advantage for this group which has been studied mainly in relation to public services (section 3.3).

Section 3.4 discusses the policy context of New Labour's neighbourhood initiatives, which provides the background for the empirical part of this study. The New Labour government's agenda addressed local services both through increased public expenditure and as targeted neighbourhood regeneration (Clarence & Painter, 1998; Durose & Rees, 2012; Levitas, 1998; Lupton et al., 2013a). The discussion identifies the ways in which social capital gained

prominence in New Labour's approach to neighbourhoods and highlights the relevant criticisms of this approach. The approach to empower communities in relation to service delivery has been expanded by the post-New Labour governments' policies, but the change of governments in 2010 has marked a significant shift in the approach to services and neighbourhood inequalities. The final section (3.5) outlines evidence on the impact of local government budget cuts on local services, and thereby highlights the contemporary relevance of the current study.

## 3.1 Public services as redistribution

While the objective of this research is to look at local services more broadly, this section begins by focusing the discussion on public services, which comprise an extensive field of literature and constitute a part of the services included in this research. Section 3.1.1 narrows the discussion to the key notions around public services as welfare and definitions of public services. Then, section 3.1.2 explains the concept of spatial equalisation in the UK.

### 3.1.1 Social welfare and public services

The UK literature that emerged in the 1970s and 1980s around urban public services focused on the spatial allocation of public resources and the social impact of this. Referring to spatial equity in public provision, Davies (1968) introduced the term territorial justice, which would be achieved when the service needs of an area are met by service provision. Meanwhile, territorial injustice has been conceptualised through the 'inverse care law'. Introduced by Tudor-Hart (1971) in the context of health care, the inverse care law posits that the availability of health care varies inversely with the need for it in the population. It implies a negative correlation between need and service provision. However, in practice the geographical patterns appear to be more complicated (Pinch, 1985; Curtis, 1989).

Within this framework of spatial equity, many studies have focused on the redistributional aspect of public services. In this framework, public services are seen to function as redistribution of real income ('social wage') and contribute to quality of life. Universal and accessible public services may be

able to compensate for some material deficiencies and provide help to individuals at particular life stages or with additional needs such as disabilities. Free public services are considered to provide what is called ‘income in kind’, for example health and education, in addition to their ‘real incomes’ (earnings, benefits, pensions, etc.). The value from these is particularly significant for low-income groups (Bailey & McNulty, 2017; Boyne et al., 2001).

The principles of universality and equal access however apply to a varying extent for different types of public services. Theoretical definitions of service provision commonly draw on the work of Samuelson (1954), who identified ‘pure public goods’ as goods that are provided collectively to the population, and that no one can opt out of consuming. This is the criterion of non-rejectability. Pure public goods function on the principle of joint supply, meaning if they are supplied to one person, they can be supplied to others without extra cost. Further, they are non-excludable: if they are provided to one person, they cannot be withheld from others who do not pay for them (Samuelson, 1954; Pinch, 1985; Needham, 2007; Curtis, 1989). Some common examples provided of pure goods tend to be water supply, parks, and fire brigades. However, the definition of purity seems to only hold in a conceptual or normative sense, in the notion that access to these should be universal. Many services such as the water supply in the UK have been overtaken by private providers, meaning that households can be excluded or cut off from supply, while for example some areas are served more poorly than others by emergency services (Pinch, 1985).

The criteria of pure public goods are not met by most services that would generally still be considered public services. Samuelson’s ideas were developed by Musgrave (1959). Most goods are ‘impure’, also referred to as ‘merit’ goods, such as social housing and welfare benefits. These services are intended for individuals with specific needs or are more relevant to households at certain life stages (such as social care). Some – usually education and health - are thought of as universally accessible, with education compulsory for children. Meanwhile others are means-tested, where access is defined by some criteria of need, as will be discussed (Musgrave, 1959; Pinch, 1985; Needham, 2007; Curtis, 1989; Bramley, 1997).

Therefore, what are considered public services vary in their 'level' of publicness and the boundaries of what is a public service are not set in stone. The notion of public services can also be considered as a difference to services allocated on a market basis, as the distribution of public goods has at least traditionally not adhered to competition and price-signalling. Therefore the public model has meant that service use does not depend on the ability to pay, but this has been obscured by the introduction of charges for some public services, such as leisure. Indeed, the distinction between public and private provision has been obscured in many countries particularly by public sector reforms that began in the 1970s. These efforts to improve efficiency have shifted public services more towards markets, with measures including privatisation or contracting out of some services. An underlying element of the 'publicness' of a service that is likely agreed upon is that they produce collective instead of merely individual benefits (Needham, 2007). The move towards more private forms of provision may also leave more scope for the efforts of individuals and communities to influence services collectively, which has also been encouraged through various partnership approaches and community empowerment in the aim to increase choice and responsiveness in public services (e.g., ODMP, 2005a; Lupton & Tunstall, 2008; Needham, 2007).

The categorisation of pure and impure goods does not appear to be applicable in the contemporary context, at least in the UK. Crucially, few public services are universally accessible due to their geographical location. Local areas vary in how they provide services, and there is spatial tapering, meaning that the distance from the good affects its consumption. As spatial distance increases, access costs increase and fewer people will be able to use the service. On the other hand, with some services, proximity brings about nuisances, such as noise or smells from waste tips (Curtis, 1989).

Bramley (1997) has proposed a categorisation of services that is more relevant in current UK context. Universal local services are open to all, although some might be privately provided, and include libraries, parks, public sports facilities, and public transport. Needs-based services in contrast are services targeted based on some assessment of social need, such as social housing.

Thirdly, we can consider services that are demand-led, which, while open to all, are quite commonly biased to more affluent users, such as cultural facilities (Bramley, 1997; Bramley & Fisher, 2006). Lastly, many local services are privately provided and based on the ability to pay. Recent evidence has found that the most 'universal' services in the UK in terms of usage, adequacy and affordability are primary healthcare and convenience retail and financial services. Meanwhile, leisure and cultural services which are provided by local authorities and nominally 'universal', are declining in usage rates and used by fewer households (Bramley & Besemer, 2016).

### 3.1.2 Equalisation in the spatial distribution of services

The strategy of equality in service provision refers to the aim of equal allocation of services to individuals and areas, which is maintained by using tax revenue to fund public services (LeGrand, 1982). There are various interpretations of equality in the distribution of service resources, that carry different implications for their geographical distribution. From the redistributional perspective, territorial justice would be realised through the allocation of resources based on the relative needs of areas (Davies, 1986).

Equalisation has been the aim in public service distribution, but there are different interpretations of equal service standards. However, the overall aim of equalisation is generally little contested. The main argument for equalisation is perhaps based on horizontal equity, meaning otherwise similar individuals should be able to benefit from the same level of services. The vertical equity reasoning in turn points out that taxes and benefits become distorted by geographic disparities without equalisation. Moreover, without equalisation, migration would occur by those who can afford to move to desirable areas, feeding segregation (Bramley, 1986). Arguments against equalisation however propose that this undermines the autonomy and economic efficiency of local areas, if for example the inefficiency of a local agency distorts the assessment of spending need. However, according to Bramley (1986) this can be avoided by assessing spending through standardised unit costs.

The aim of equalisation more generally relates to the aim of redistribution in welfare policy and can be justified through different criteria. Geographical equalisation is to a large extent realised in the UK through local grants from central government (Bramley, 1986). As additional revenue to locally collected taxes, grants from central government to local authorities are essential in redistribution and constitute the main mechanism in the aim for geographical equity. Traditionally, local authorities have been set controls on their spending in exchange for grants (Bramley, 1986), but recent years have seen the shift to greater autonomy for local authorities over their total budgets, as will be discussed.

Standards in equal distribution can mean that spending is equal across areas, relative to need, or relative to the local tax base. However, they also need to consider the aim of distribution; whether it is equality of access, provision, or outcome. Bramley (1986) has proposed a typology of criteria in relation to the definition of equal distribution of service resources.

First, normative standards refer to ones where a professional or political body decides the appropriate quantity of resources. Within this type, Bramley separates a few different standards. The input standard means that a local service can be allocated a certain amount of money per scale unit, i.e. population. The output standard in turn that some level of service output is provided for each scale unit. However, outputs are often difficult to measure as services may not involve a measurable product but occur between the agency and consumer. One example where the output standard is used is refuse collection, the output being one collection per dwelling per week (ibid.).

According to the need-related input standard, the resource inputs, i.e., money provided, are adjusted to the level of need in the population as well as the geographical scale. An example of this in the UK is the needs assessment for health services, where age structure of the population is a major factor in resource allocation as age is strongly linked to service needs (Bramley, 1986; 1990). Need can also be considered in regard to the service output so that the output varies in a similar way. This occurs in social services for the elderly and children (Bramley, 1986).

Bramley's (1986) typology of criteria reflects the concept of need put forward by Bradshaw (1971). Bradshaw identified four types of need, of which normative need relates to the above-mentioned normative standards. Bradshaw further defined comparative need, which lies behind the argument for equal geographic distribution of spending. Comparative need is identified when the population of one geographical area not receiving a service shares characteristics with a population that is in receipt of the same service in another location. This implies that not only should an area spend according to its level of need, but there should also be an equal ratio of spending across all local areas (Bradshaw, 1971; Pinch, 1985).

The second group of equalisation criteria is based on individual perceptions of their own needs, felt need as defined by Bradshaw (1971). Individualistic standards in equalisation are based on welfare analyses of demand and cost and derive from individual preferences. As one, the demand standard implies that the service is delivered in proportion to the demand that users express. This can be considered as the expressed need (as in Bradshaw, 1971), as not only do individuals feel the need but also voice it. This is in fact used in 16-plus education, where resource allocation is based on actual student numbers (Bramley, 1986). Finally, resources can be allocated proportional to the local public agencies' actual expenditure (past or proposed), by again considering either the input or outputs as standards.

The basis for the distribution of local government finance can be further thought of through rights or effort (Boyne et al., 2001). The criterion of 'rights' implies that areas are entitled to spending proportionate to their contribution to national and local taxes. This is associated with entitlement and adheres to the 'beneficial principle' instead of redistribution; people 'get what they pay for'. Secondly, Boyne et al. (2001) define the criterion of 'effort' which implies that local areas would be rewarded for their choices. Thus, it requires some voluntary action or 'self-help' from the local government. It would imply that "all areas should be able to provide the same standard of service by drawing upon the same proportion of their tax base." (Boyne et al., 2001, p. 25). So for example, effort can be measured as levy on properties in a band of council tax. The rights and effort criteria have not been applied to a large extent in the UK, and rather considered to create inequity. The evaluation by Boyne et al.

(2001) revealed that despite the 1980s and 1990s Conservative governments' emphasis on market criteria in local government, the dominant criteria in resource allocation still adhered to service needs.

## 3.2 Geographical imbalance in local services

Despite efforts for equalisation, research has asserted that there remain large structural imbalances in service provision between areas. Deprived areas are consistently found to experience more constraints that arise from unavailability, inadequacy, and unaffordability of services (e.g., Bramley, 1997; Bramley & Besemer, 2016; 2018; Duffy, 2000; Hastings, 2009b). However, access to local services is of particular importance in areas with large proportions of low-income households and lower levels of mobility. The neighbourhood literature in Chapter 2 identified local services as a central part of the residential context that can contribute to unequal opportunities. In deprived areas "local services constitute an even greater part of the real income of the population" (Boyne et al., 2001, p. 20). Access to goods and services locally is particularly important in deprived areas which tend to have higher proportions of residents whose mobility is more restricted by disabilities, older age, and having young children (e.g., Bramley, 1990). Reliance on public transport in these areas tends to also be higher as car ownership tends to be lower (Hine & Mitchell, 2017). Services can also function as a 'gateway' for information (e.g., libraries) and access to wider opportunities (e.g., job centres) as well as improve quality of life and wellbeing (e.g., parks and sports facilities) (Bramley, 1997; Bramley & Evans, 2000). Facilitating mobility for these groups appears particularly important, as deprivation understood as wider social exclusion impinges on the ability to participate in society, accessing jobs, and visiting friends and family. Recently, it has been found that the importance of services as income in kind as a proportion of low-income households' real income has been increasing, partly due to reductions in the value of cash benefits (Bailey & McNulty, 2017).

There are strong arguments to justify why deprived areas should receive more of public spending. Poorer outcomes in crime levels, antisocial behaviour, and levels of education and unemployment are partly evidence of services failing to meet the needs of residents in disadvantaged areas. However, services are

often under pressure to meet higher levels of need among residents in these areas, which contribute to these outcomes. These 'negative externalities' (drug use, crime) arising from poverty create additional demands for services such as the police and social work. It is also known that poor areas have difficulty in attracting good teachers or GPs (Bramley & Evans, 2000; Hastings, 2009b; Duffy, 2000). Services may experience a negative 'spiral', when increased pressures and costs lead to lowering quality of services. Services risk moving from a mainstream provision to 'residualisation', so that they are used by only the less well-off with no alternatives (Bramley & Evans, 2000). This constitutes failure on the part of resource allocation to consider the need profile of deprived areas.

In addition to area deprivation, distributional imbalances in service usage relate to households' socio-economic status and material deprivation. Households on low incomes will be more affected by costs incurred from travel and for example childcare. Poor residents are also more reliant on public services without the resources to buy private ones. For example, reliance on public transport also means higher cost of transport compared to car ownership (e.g. Bramley & Besemer, 2016; Goodin & Le Grand 1987). Recent evidence from Glasgow has found that inadequate public transport has forced car ownership on some households in deprived areas despite financial difficulties (Curl et al., 2018). Further needs of households from public services are more complex due to reasons such as health care made difficult by problems with stress, poor diet, and poverty (Bramley & Evans, 2000). Therefore examining service use in different areas requires considerations around other issues experienced by the areas' residents, which is seen to be often lacking in policy agendas.

Arguments for social mix highlight that services in low-income areas may benefit from introducing households with higher incomes (usually home-owners) into the area. However, this may not necessarily be the case, as the potential economic benefits from high-income residents may not correspond to the need for universal services of low-income areas. As households with higher incomes rely less on public services and make more use of private provision of services (for example in health and education) (Bramley & Evans, 2000; Duffy, 2000), the use of 'universal' services may decline and become less

economically viable (Bramley & Fisher, 2006). Again, the 'opting out' of more affluent households from local services may be intensified if services in an area begin to deteriorate (Gal, 1998). The usage of multiple universal services, such as libraries, has been declining and moving to a more marginal user group. Further, this is feared to undermine political support for universal services particularly in relation to the cuts under current austerity (Bramley & Besemer, 2016; 2018).

There has been an increase in targeted provision of services in a turn away from a universalist approach. Deprived areas (in England and Scotland) tend to receive targeted spending and receive higher per capita spending within services including means-tested benefits, children's services, and social housing (Bramley & Evans, 2000; Mcpherson et al., 2007). They were also targeted through regeneration programmes under the New Labour government, which this chapter will discuss. Bramley and Evans (2000) analysed public spending programmes in English wards and found perhaps surprisingly that deprivation at small-area level had a positive relationship with spending, while controlling for other geographical and demographic factors. Non-deprived areas are commonly delivered more expenditure in service areas such as higher education, some environmental services (roads, parks) and rail subsidies (Bramley & Evans, 2000). Therefore, it can be argued that service provision in deprived areas may be better targeted for low-income households than those in mixed or more affluent areas (Bramley, 1997; Wood, 2003).

The geographic distribution further varies in regard to the types of services provided. Research has found that buses, meal services, childcare, and other children's services are more often considered inadequate in more deprived locations despite targeted spending on these services (Bramley, 1997; Duffy, 2000; Clark & Kearns, 2017). Based on the People's Panel survey from 1998, Duffy (2000) has pointed out that residents of deprived areas had worse perceptions of public transport, while otherwise differences in service ratings to well-off areas were not very pronounced.

The Poverty and Social Exclusion (PSE) survey from 2012 was conducted after the change from the New Labour government to the Conservative government in 2010, and therefore is of interest for our research. Compared with the

previous survey in 1999, the 2012 PSE showed improvements in services for children and transport, but retreat in leisure and culture. Unavailability and inadequacy in local-authority provided leisure, cultural and information services has increased noticeably since 1999. In needs-based services, targeted towards elderly and disabled adults, the survey found relative stability, but special transport and meals on wheels were shown to have more constraints. Overall, the results were similar to those obtained from the 1990 Breadline Britain survey (Bramley, 1997; Bramley & Besemer, 2016), which points to a lack of improvements achieved during the 1990s under the New Labour administration.

Somewhat contrary to the PSE were the findings by Macintyre et al. (2008) in the Scottish context. They discovered patterns in the distribution of specific types of services. Poorer areas did not have consistently fewer services but rather, some services were more often located near affluent areas (private sports resources) and some closer to poorer areas (public sports facilities). Pointing to the importance of differentiating between types of service, they further note that while deprived areas did not clearly lack services, the proximity to some services is not beneficial, as almost a third of fast food outlets were located near the most deprived quintile of areas (ibid.). In summary, previous studies suggest that research on geographical imbalances in service provision should consider both access and the quality and type of services in small areas.

## 3.3 Service rationing and class influence

Differences in levels of service provision are not only a question of internal mechanisms of neighbourhoods, but also how institutional standards and practices impact on them. Research has in fact showed that public service providers can act to entrench the disadvantage of some areas, while middle-class areas tend to have more power to influence decision-makers to gain advantages over service provision (Hastings, 2009b; Matthews & Hastings, 2015). The advantage is also seen in concrete terms, as analyses of expenditure in the UK have shown that state expenditure benefits the well-off to a greater extent overall (Goodin & Le Grand, 1987; Gannon et al., 2016). Although low-income groups are the primary beneficiaries of some services such as social

services, the middle classes are likely to benefit more from for example educational expenditure as they participate in it longer including higher education (Bramley & Fisher, 2006; Goodin & Le Grand, 1987; Gannon et al., 2016; Gal, 1998).

The ability of middle-class individuals to influence the policy process or 'hoard' resources has been called the 'sharp elbows' argument (Hastings & Matthews, 2011). The advantage arises through various channels, of which some are the result of strategic actions, while some follow from the attitudes of service providers (Hastings & Matthews, 2011; Hastings et al., 2014). Evidence has emerged regarding double standards in service delivery between deprived and affluent neighbourhoods. An enquiry by Hastings (2009b) finds evidence for three types of service rationing, which refers to the allocation of resources and the ways in which service providers ration or restrict them to manage competing claims for specific levels of service. Institutional rationing implies that service providers 'can inadvertently discriminate against deprived neighbourhoods through a set of systemic, pervasive and habitual policies and practices' (ibid; p. 4) and refers to the decision-making processes inside an institution. Reactive rationing highlights how the practices and attitudes of service staff can react when implementing services, particularly how they differ in affluent and deprived neighbourhoods. This relates to systematic biases within institutions that affect the behaviours of staff. Particularly, challenging workloads may cause staff to react with rationing. Finally, a key concept in light of this study, political rationing draws attention to differences in political efficacy between neighbourhoods and the impact on service provision (Hastings, 2009b). This framework highlights how the quality of services is responsive to the variations in political power and pressures in neighbourhoods.

Collective political resources have been found to be more prominent in affluent neighbourhoods allowing them to demand or lobby for better services. The higher levels of collective organisation among middle-class residents allow them to impact more effectively on decision-making processes, which was previously referred to as collective efficacy. The framework applied by Hastings and Matthews (2011; 2015; Matthews & Hastings, 2013) to identify mechanisms of influence relies on a Bourdieusian view of different capitals and

thereby highlights the uneven distribution of power across neighbourhoods. The collective efficacy of predominantly middle-class areas stems from the social and cultural capitals that residents and groups are able to harness (Hastings et al., 2014; Rolfe, 2016; Clifford et al., 2013). Cultural capital refers to the skills, education, networks, and resources that can be relied upon in negotiating with service providers (Hastings & Matthews, 2011). Therefore predominantly middle-class areas tend to host the type of skills and capacities that improve their ability to organise collectively and influence decision-makers. Skilled human resources and leadership abilities are considered a key asset for communities that contribute to effective organisations, in addition to the financial and physical assets of a community (Kearns, 2003; Rolfe, 2016).

Cultural capital is also manifested in the tendency of middle classes tend to be more assertive in their demands and more likely to contact higher-level officials and area representatives about issues, leading them to capture more of service expenditure (e.g. Bramley & Evans, 2000; Goodin & LeGrand, 1987; LeGrand, 1982; Hastings et al., 2014). This may lead to strategic behaviours from service providers in order to minimise complaints (Hastings & Matthews, 2015). Further, the higher levels of social capital among affluent groups imply that residents are able to build networks and hold more leverage in relation to institutions and officials, and thereby potentially access types of information not otherwise available (Goodin & LeGrand, 1987; LeGrand, 1982; Hastings et al., 2014).

Evidence has also arisen in regard to the advantages arising from a cultural alignment between middle-class service users and service providers. The habitus (embodied cultural capital) of middle-class users is a better ‘fit’ in the field of service provision. This means that they know appropriate ways to articulate their issues and are better able to access information due to their linguistic and cultural capital gained through education. Consequently, it has been argued that the needs of middle classes are very much normalised in policy and resource allocation (Hastings & Matthews, 2015). This alignment is also manifested in the predisposition of service providers to address the needs of more affluent groups, of which rationing is an example. This stems from higher-level civil servants themselves being middle class, as their interests and social circles affect the decisions (Gal, 1998). The similarity of the middle-class

habitus to that of service providers has also been found to produce empathy, facilitating interactions and ultimately leading to receiving more resources (Hastings & Matthews, 2015).

Higher expectations in affluent neighbourhoods again introduce behavioural responses from service providers that justify high service standards. This has been partly evidenced by research findings around the skewed allocation of environmental services towards middle-class areas despite recognition of higher needs in deprived areas (Hastings, 2009a; 2009b). In turn, poorer service provision and quality in deprived areas is likely to contribute to residents' lower expectations of these (ibid.; Duffy, 2000). There is evidence on the discriminatory practices in service allocation and provision, as for example staff tend to reinforce the low standards when dealing with poor residents (Hastings & Matthews, 2011). In turn, when service provision does not meet the needs of the neighbourhood, this may create a sense of powerlessness and weakened collective efficacy (Atkinson & Kintrea, 2001; Hastings, 2009b; Sampson et al., 1997).

Arguably, more research is needed regarding whether the influence of some groups can lead to improvements that benefit the whole community, and to understand the role of public services in tackling disadvantage in areas with mixed incomes. The current research aims to examine whether service outcomes relate to the socio-economic status of residents, or levels of social capital and political organisational capacities (collective efficacy) of neighbourhoods. The next section discusses the policy agenda of the New Labour government, which particularly emphasised the role of community empowerment and social capital in neighbourhood regeneration.

## 3.4 Neighbourhoods and public services under New Labour

This section provides an overview of the UK policy context for local services in the period of the New Labour government (1997-2010), which this research aims to investigate. For the majority of the time period, Labour was also in power in Scotland with a Liberal-Democrat coalition (Mooney & Poole, 2004). New Labour set out many neighbourhood renewal programmes aiming to tackle

the impacts of social exclusion and poverty, which will be overviewed in the first sub-section. The second sub-section will focus on New Labour's public service reform, while the third discusses the role of social capital and community involvement in Labour's policies.

### 3.4.1 Neighbourhood renewal

New Labour's approach to urban regeneration was to develop 'mixed communities' in disadvantaged urban areas to reduce concentrations of poverty and to tackle negative neighbourhood effects, which were seen to compound residents' disadvantage (SEU, 2001; Lupton & Power, 2005; Durose & Rees, 2012). This approach to neighbourhood renewal was a response to concerns about worsening problems which were concentrated in disadvantaged areas, and thereby represented a significant turn in policy (Lupton & Power, 2005).

The emphasis on mixed tenure was tied to the policy emphasis on social exclusion. New Labour established the Social Exclusion Unit (SEU) in 1997 to address the social exclusion of neighbourhoods as an across-government issue. The unit set out a National Strategy for Neighbourhood Renewal (NSNR), which identified the problems of concentrated poverty, unemployment, poor health, and crime in approximately 3000 neighbourhoods. One aspect highlighted by their analysis was a lack of amenities and poorly performing public services, with for example schools that were falling behind national levels. As part of a number of long-term goals, the SEU set the absolute improvement of economic and social conditions in poor neighbourhoods. Key to the approach was that national targets were set to close the gap between the most deprived neighbourhoods and the rest of the country (SEU, 1998; Lupton, 2003; Lupton et al., 2013a; Lupton & Power, 2005; Durose & Rees, 2012). A final evaluation report states that the programme achieved significant improvements in most indicators covering the key targets (Batty et al., 2010).

The SEU began to combine mainstream policy programmes with more joined-up local solutions, as it was seen that mainstream programmes were performing worse in deprived areas. This was to tackle the joined-up or overlapping problems of individuals, while allowing for a focus on specific

policy areas in neighbourhoods. This was the first time that policy interventions from such a broad range of different departments were integrated around the focus of neighbourhoods (Lupton et al., 2013a; Lupton & Power, 2005; Durose & Rees, 2012). The approach to neighbourhood regeneration was 'holistic', as it combined sectors across government such as health, education, and housing. It was recognised that problems faced by disadvantaged areas such as unemployment, crime, and poor health were connected, and therefore neighbourhood became the focus of interventions (Durose & Rees, 2012). The distinct approach adopted by New Labour consisted of area-based initiatives (ABIs), which included both comprehensive area regeneration schemes and specific Action Zones on health, education, employment and early-years development. The programmes were to be delivered at the neighbourhood level through forming Local Strategic Partnerships between the public sector, local authorities, and other local organisations and communities (SEU 1998; Clarence & Painter, 1998).

The area-based approach has also received criticism. First, the targets that were set were measured on chosen indicators, which could not take into account all aspects of low-income areas. The set of indicators might have shown improvement but not necessarily address everyday problems faced by residents of disadvantaged areas, such as some liveability factors (Lupton & Power, 2005; Chatterton & Bradley, 2000; Tunstall & Lupton, 2003). Secondly, the initiatives are said to have lacked a clear definition of a 'poor neighbourhood' and the populations that the initiatives would address. Consequently, some poor neighbourhoods were left out of the New Deal for Communities. As Watt and Jacobs (2000) point out, regeneration strategies were likely to involve competition over the implementation of these policies.

While initiatives under the NSNR concerned England, The Scottish Executive's (2002a) Community Regeneration Statement similarly set out to improve outcomes in poor neighbourhoods in absolute and relative terms, outlining that local service provision should meet national standards. Long-term goals for deprived areas were to be met through a combination of mainstreaming and area-based approaches. The Scottish Government launched Social Inclusion Partnerships (SIPs) programme in 1999, which aimed to both bend mainstream services and develop area-based programmes for deprived neighbourhoods

(Mcpherson et al., 2007). In comparison with the English ABIs, less funding was put into the Scottish equivalents, and targets were monitored to a lesser extent (Lupton & Power, 2005).

### 3.4.2 New Labour's public service reform

In addition to their neighbourhood renewal plans, New Labour placed public services in the centre of their agenda through a public sector reform, which comprised increased spending and changes in the way services were delivered. When Labour came to power, public services had experienced under-investment under the Conservative governments from the 1980s, and public expenditure had been reduced with tightened spending controls. Under the Labour government, spending on public services grew by an average of 4.4 % a year in real terms. This was mainly due to increased spending on healthcare, education, and transport, as estimated by the IFS (Chote et al., 2010). It was estimated that both the quantity and quality of services improved by a third between 1997 and 2007. However, their productivity fell as service outputs were less than the increase in inputs, and the relative price of inputs rose with inflation. Further, increases in prices and pay meant that public service inputs grew only about 3.3% a year. In terms of what taxpayers were receiving for their money, the average quantity of public service outputs over spending actually fell by 13.4% in the 10-year period. The report by IFS however notes the possibility of the extra inputs having improved the quality of services in ways that could not be measured, such as teachers' higher pay leading to more satisfaction and motivation (Chote et al., 2010).

New Labour's agenda further aimed to modernise service delivery and make public services more responsive to individuals and communities' needs. To achieve this, as key characteristics of the approach can be identified the promotion of partnerships and greater use of private sector funding. A distinctive approach in New Labour's reform, named the 'Third Way', implied the introduction of local partnerships between local authorities, community and voluntary organisations, and private agencies. Therefore the Third Way increased the role of private, voluntary and community organisations in services delivery and thereby encouraged networks between the state, businesses, and the voluntary and public sectors (ODMP, 2005a; Lupton &

Tunstall, 2008; Needham, 2007). The rationale behind Third Way was essentially to combine the state with the market while minimising the disadvantages of both; not leaving neighbourhoods to be controlled by property and labour markets but neither intervening too much (Imrie & Raco, 2003; Lupton & Tunstall, 2008; Needham, 2007).

In addition to a partnership approach, the role of private funding was manifested in Public-Private Partnerships (PPPs), which New Labour introduced as a key policy instrument to respond to poorly performing public services. PPPs originated from the Private Finance Initiative (PFI) programme launched in 1992, which had implied a change in the procurement of major assets for local authorities even before Labour's reforms. Under PFI, the public sector shifted from procurement of service assets to purchasing or contracting services to the private sector, which meant that local authorities would for example lease school and office buildings from private companies that would in turn be responsible for the management and operation of facilities. PFI aimed to improve local authorities' access to capital investment and transfer risks involved to contractors while introducing private sector managerial skills to public sector workers (Hood & McGarvey, 2002; Poole & Mooney, 2006). However, the PFI/PPP model has been criticised for its commitment to efficiency goals in service provision and lack of accountability over public sector spending. Increased efficiency measures were considered likely to impact quality, where councils opt for the cheapest form of delivery, such as construction of public buildings, under the 'best value' policy. PPPs were adopted by Scotland's local authorities to carry out projects involving large-scale investment. In the early 2000s, major PPP projects had been undertaken on roads and infrastructure, and the refurbishment and building of schools and hospitals (Hood & McGarvey, 2002; Poole & Mooney, 2006).

Some claim that the increase of privatisation and efficiency in New Labour's public service reform represent a continuation of the previous Conservative governments' reshaping of the sector. At the same time as spending had been increased, cost-efficiency was expanded in service provision. For example, co-payments for the use of services that previously had been tax-funded were introduced (e.g., university tuition fees). Conditionality was introduced across different public services; this included the large-scale transfers of social

housing stock to 'arms-lengths' management organisations, and expansion of means-testing in welfare benefits (Needham, 2007). According to critics, Labour continued 'dismantling the cornerstones of the post-war welfare state' by retaining of some of the Conservative government's interventions, such as deregulation and privatisation (Imrie & Raco, 2003, p. 13; Needham, 2007). The Thatcher and Major governments (1979-1997) had redefined the scope of public services in a substantial way. While New Labour made significant efforts to address services, it is said to have carried on the reforms, and in some cases intensified measures of efficiency, decentralisation, and privatisation.

Some notable differences can be found in regard to the delivery of public services in Scotland, where the Scottish administration established in 1999 gained legislative and executive powers over a number of public services. Key policy divergences of Scottish policy in the early 2000s occurred in education, and health and social care, with the abolishment of university tuition fees, free long-term care for older people, and better pay and conditions for teachers, while the NHS in Scotland has tended to receive higher levels of funding (Mooney & Poole, 2004). Other devolved services included environmental and leisure services, and many aspects of transport such as rail services[1]. Keating (2005) argues that Scotland's Policy differentiation derives from a greater commitment to social justice and public provision of services. Some elements of marketisation and competition were not introduced in Scotland as in England, where New Labour's shift away from public provision to market-based solutions and PFI was more marked, and Scotland (at least at the time of Keating's writing) maintained a greater reliance on local government as a service provider (ibid.).

In Scotland, the partnership approach has been particularly manifested in Community Planning Partnerships (CPPs) established through the Local Government Scotland Act 2003. CPPs have become a key focus in the delivery of public services in Scotland and aim to improve service delivery by addressing the priorities and needs of specific areas. CPPs represent a joined-up approach to improve service delivery by encouraging local authorities, voluntary, community, and private sectors to work together to develop and implement a

[1] https://www.parliament.scot/visitandlearn/Education/18642.aspx [Accessed 06/08/19]

strategy for their area (Communities Scotland, 2003; Sinclair, 2008). Community Planning also represents a shift in local government decision-making to a 'governance' model bringing together multiple actors, as it aims to increase community involvement and citizen participation in decision-making. Community participation in the development and delivery of services would be realised through committees and other forms of area-level participation (Scottish Executive, 2002b; 2002b; Communities Scotland, 2003).

The 2003 Act made participation in partnerships mandatory for the joint health, police, and fire service boards, Scottish Enterprise, and regional transport partnerships. Partnerships have been formed to address a range of local issues in areas such as health and social care, education and early-years development, employment, and police and fire services (Asenova et al., 2007). Community planning has particularly been applied in environment planning and regeneration, and for example, CPPs were consulted in the regeneration of disadvantaged neighbourhoods in 2004/5 (Scottish Executive, 2002b; 2006).

Many however remain sceptical of the benefits of Community Planning. Effective partnership working is seen to require local community and voluntary organisations to be involved in the process a meaningful way, while partnerships can often be led by governmental agencies and have an inherent power structure. Partnerships therefore set additional requirements for communication, mutual relationships and trust between organisations, and the bureaucracy involved in working between multiple agencies can be a burden on some organisations, while consultations may also involve increased time demands and costs on citizens. Moreover, research has found the effectiveness of partnerships limited, if they are not integrated into mainstream local government programmes and decision-making, and if neighbourhood-level initiatives are not supported by policy at higher spatial levels (Laffin et al., 2006; Sinclair, 2008; Cook, 2015).

Researchers have noted that the establishment of area-based partnerships and CPPs were allied with the modernisation and efficiency reforms by the New Labour as well as the Scottish Government (Sinclair, 2008; Mooney & Poole, 2004; Keating, 2005). Partnerships can be said to have reflected the agenda of decentralisation of government and increased market orientation in public

service delivery (ODPM, 2005a; Scottish Executive, 2006). This had been accompanied by financial controls and performance targets for local government already under the Conservatives, which were intensified under Labour (Needham, 2007), while Scotland has not adopted a similar emphasis on regulation and targets as England (Sinclair, 2008). The reforms have further been criticised for contradictions with the urban policy of New Labour. As 'core' public services such as healthcare and transport are increasingly being operated by private sector companies, private services are likely to leave poorer communities that lack the consumer or market power to safeguard existing levels of service, thereby contributing to their isolation (Rose, 2000c, in Imrie & Raco, 2003).

### 3.4.3 **Focus on social capital and community empowerment**

The approach adopted by the Social Exclusion Unit focused on a broad definition of social exclusion as a shift away from the terms poverty and deprivation. Social exclusion is a wider concept and refers to the disconnection of individuals from employment, opportunities, and decision-making. Framing the problems of disadvantage neighbourhoods and individuals in this language allowed New Labour to move the focus "away from poverty, the economy and jobs, towards 'softer' issues" (Kearns, 2003, p. 39). Problems were seen to derive from traits such as skills, cultures, and aspirations of individuals and communities, instead of material resources. This coincides with New Labour's shift away from its focus on social justice after 2004 and the emphasis on the economic competitiveness of areas (Lupton et al., 2003).

In line with the focus, authors have argued that New Labour's regeneration approach embraced social capital as a means to combat social exclusion (Kleinman, 2000; Kearns, 2003; Hastings, 2003). The concept of social capital suited the general policy agenda set by the SEU (2001) which emphasised skills and cultures in access to employment, and community participation in local decision-making and public services (Lupton et al., 2013a; Levitas, 1998; Kearns, 2003). In line with this agenda, Labour's approach to urban regeneration was based, first and foremost, on policies designed to provide people with the skills and capacities to reduce their poverty and dependence on state support. The neighbourhood renewal programme proposed by the SEU

(1998) as well as the Scottish regeneration policy (Scottish Executive, 2002a) referred to social capital as a way of incentivising people and communities to help themselves. Social capital as related to skills, resources and networks could improve sense of power, motivation and self-esteem in poor communities through informal community learning and action (Kearns, 2003; Burton et al., 2004). The aim was to build skills and confidence through volunteering and participation in community associations, which would make residents act to improve their community and influence or run public services (SEU 2001; Imrie & Raco, 2003; Levitas, 1998).

This emphasis on social capital further appeared in New Labour's 'Third Way' approach. Local partnerships were considered to have the benefits of creating social capital and improving local democratic abilities through community participation (Burton et al., 2004; SEU, 1998; Docherty et al., 2003). The way in which communities would improve their services was embodied in the term 'community capital', referring to community organisations and partnerships. Neighbourhood organisations would link communities to policy makers with their networks, and further access resources to support collective actions and social activities to produce social capital (Kearns, 2003; Kleinman, 2000; Lupton et al., 2013a). The agenda set out by The Scottish Executive (2002b) similarly aimed to increase communities' influence over the integration of local services and discussed social capital under the theme of community development. However, as a difference to UK-level policy, the Scottish approach introduced targeted programmes to build capacity for participation and leadership skills within communities (ibid.; Rolfe, 2016). Furthermore, the Scottish policy seems to explicitly pay attention to potential issues regarding social capital in community empowerment by stating that community groups must be aware of their inclusivity (Scottish Executive, 2002b).

The focus on social capital and the wider discourse of social exclusion have been criticised for their failure to account for the role of income and employment in tackling inequality (Kearns, 2003; Levitas, 1998; Lawless et al., 2010; Watt & Jacobs, 2000; McCulloch et al., 2012). Communities were expected to actively help themselves, and the government should only help communities take advantage of their social capital, while effectively refraining from providing resources (Kearns, 2003; Kleinman, 2000; Lupton et al., 2013a).

Critics go on to state that the political narrative which centres around the responsibility of communities and individuals to improve their situation deliberately deflects attention from the causes of poverty (Kearns, 2003; Levitas, 1998; Watt & Jacobs, 2000). Indeed, Watt and Jacobs (2000) conclude that the neighbourhood initiatives of New Labour avoided addressing problems of poor housing and poverty directly by using this language of social exclusion and considering the source of problems in neighbourhoods to be the 'underclass' culture and anti-social behaviours. Furthermore, the role of social capital was most likely overstated in combating social exclusion, leaving aside the impacts of labour and housing markets among others. Social capital turns the attention away from the lack of jobs and low income to 'network poverty', ignoring structural inequality and the redistribution of power and resources (Levitas, 1998; Kearns, 2003; Watt & Jacobs, 2000).

Critics have further argued that the community empowerment approach lacked recognition of local communities' unequal positions in gaining access to resources and engaging with decision-making processes. More affluent communities are likely to advantages in this regard, as they are found to host more formal and political types of participation, while the community organisations in these areas tend to also be more connected to decision-making processes (Temkin & Rohe, 1998; Purdue, 2001; DeFilippis, 2001). In turn, some have pointed out that disadvantaged neighbourhoods may lack power to influence decisions despite hosting social networks and community organisations (Levitas, 1998; Lawless et al., 2010; Watt & Jacobs, 2000; Hastings, 2003; Rolfe, 2016). Affluent communities are also more likely to benefit from the skills and cultural capital of highly-educated individuals that allow them to gain access to information, take advantage of these opportunities and to manage cooperation successfully (Clarence & Painter, 1998; DeFilippis, 2001; Rolfe, 2016). Therefore increasing levels of volunteering or other civic participation in disadvantaged communities is unlikely to help them to compete for resources and overcome barriers to political influence (Kearns, 2003; McCulloch et al., 2012; Cheshire, 2007). In this way, participation and the lack thereof relates to the distribution of power and abilities, which resonates with a Bourdieusian view of social capital (DeFilippis, 2001). Bourdieu (1986) focused on the ways in which certain social

groups gain power through economic, social, and cultural capitals. Policies are found to have lacked recognition of communities being unequal in their strengths (Watt & Jacobs, 2000) and that the local governance of cities itself impacts upon the possibilities for communities to enact collective influence (Kearns, 2003; Imrie & Raco, 2003). This implies that disadvantaged communities are to be empowered, the exclusive character of many decision-making processes should also be addressed (DeFilippis, 2001; Kearns, 2003; Imrie & Raco, 2003).

## 3.5 Local services under austerity

This section turns to discussing more recent reforms in public services, which in some aspects represent a reversal of the efforts of New Labour to narrow differences in service provision between areas. After the 2010 general election, funding of public services has undergone drastic cuts through austerity measures, while local government has faced large reductions in their funding. At the same time, restructuring of government has pushed responsibility for service provision to local authorities, who are left with no additional revenue (IFS, 2015; Hastings et al., 2015). Policies are found to have shifted the focus further away from social justice adhering to a neoliberal ideology, while intensifying the civil engagement agenda (e.g., Evans et al., 2013), which was present during the New Labour government. While the current study is not able to observe the effects of the latest cuts on public services, these actions are likely to reverse positive impacts of the New Labour reforms and increase inequalities between areas. This section will review the impact of austerity on public services in section 3.5.1. After this, it will discuss the community empowerment agenda under localism in section3.5.2.

### 3.5.1 The impact of austerity cuts

The question of services is particularly concerning in the current context of major reductions in spending on public services after 2010, which evidence has found to significantly impact on both the level and quality of local service provision. After the New Labour period, departmental spending, which includes public services, was cut by 9%, and the central government grant to local authorities saw a 53% budget decrease (IFS, 2015). Scottish local authorities

have also faced reductions in their finances in recent years (5% in 2015/2016). In Scotland, spending on most services is found to have increased up to 2010, after which it either fell (as with education) or remained flat (as with social care). Local authorities tend to protect services such as social care and children's services, while cuts to leisure, culture, and planning are consequently higher in proportion (Hastings et al., 2015).

According to a recent report, while spending on particularly youth and child services has been affected, an increasing amount of households are finding local services inadequate as a consequence of cuts which have begun to touch frontline services. Workloads and pressure to deliver services under more limited budgets have increased stress for frontline staff, which is set to deteriorate quality of outputs to the public (Hastings et al., 2015). A report by Audit Scotland (2016) finds that customer satisfaction in general has been on the decline and funding reductions are predicted to be larger in the future.

Researchers agree to a large extent on the Coalition and Conservative governments' policy agenda under austerity being particularly harmful to disadvantaged communities in England as well as Scotland (Hastings et al., 2015; Lowndes & Pratchett, 2012; Hancock et al., 2012). Deprived areas have suffered disproportionately higher cuts, which is likely to contribute to geographical inequality in public service provision. Between 2010/11 and 2013/14, authorities in the least deprived quintile lost 16% of their spending power compared with 21% for those in the most deprived three quintiles (Hastings et al., 2015). In Scotland, cuts were slightly lower as the Scottish Government protected authorities to some extent and has maintained funding support for local authorities with higher levels of need. The Scottish government has for example compensated local authorities so they can maintain expenditure on council tax rebates. However, the freeze on council tax has deprived authorities of income, worsening the impact of the cuts (Bailey & McNulty, 2017).

### 3.5.2 **Localism and community empowerment**

Although the current research will mainly focus on the New Labour period, some connections can be drawn with the recent Coalition and Conservative

governments' approach on public services. While local partnerships and community engagement was accorded a central role in New Labour's approach, the post-2010 governments have extended criticism on centralised state powers and intensified the aspect of community empowerment. The policies were implemented at UK level through the Localism Act in 2011, which aimed to give a greater role to communities in creating public services, while large cuts on local government funding were introduced under austerity (Lowndes & Pratchett, 2012; Hastings et al., 2015).

Similarly to New Labour's approach, localism continued devolving powers to communities and establishing a greater role in public services for voluntary and community organisations. 'Localism' has been used to describe decentralisation of political responsibility or decentralisation to many 'local' agencies such as community organisations, private-sector firms, and civil society organisations. According to the classical-liberal definition, localism assumes local neighbourhood government to be more efficient and responsive but less bureaucratic than national government (Clarke & Cochrane, 2013). Hence, it devolves decision-making or delivery functions to the locality but is criticised for not devolving actual powers or resources (Evans et al., 2013). In contrast to New Labour's partnership approach, the 'new' localism was framed through the 'Big Society' discourse by the Conservative government, which placed emphasis on the responsibility of individuals and families with the retreat of state involvement (Lowndes & Pratchett, 2012).

In Scotland, the Community Empowerment Act (2015) established localism in public service delivery, and some consider it to represent a divergence from UK policy (Elliott et al., 2019) Elliott et al. (2019) state that community empowerment has been a significant emphasis in the Scottish approach to public service provision, one principle of which has been the co-production of services. The Act argued for the improvement of community participation in the design and delivery of services, and the importance of considering local residents' opinions on service provision, and strengthened the involvement of community agencies in public services and right to buy assets from the public sector (ibid.). In addition, research has found that as a result of the empowerment act and local authority cuts, some community organisations and

citizen groups have been transferred responsibility for public services such as cleanliness, caring, and coproducing health outcomes (Hastings et al., 2015).

Researchers have argued that localism has resulted in a contradictory form of local governance, which derives from a neoliberal ideology (e.g. Lowndes & Pratchett, 2012; Hancock et al., 2012). The ideology has been used to justify austerity policies while framing the public sector budget cuts in community empowerment (Rolfe, 2016; Hastings et al., 2015). This civil society' agenda from the 1990's urban policy, but has been accelerated by the latest austerity period. Despite providing more freedoms for local authorities to respond to the needs of their community, the localism agenda has been heavily based on negative liberties with a clear lack of positive ones in the form of resources (Lowndes & Pratchett, 2012). The agenda is found to represent a shift in responsibility, as the approach expects local governments to contract their role as service providers and transfer responsibility to individuals and communities. These retrenchment strategies involve for example transferring assets and facilities to community trusts and organisations with the aim to avoid future costs (Hastings et al., 2015).

Efforts in community empowerment however face difficulties in involving particular communities and groups. Evidence has arisen in regard to a 'participation gap' in community empowerment, as studies find citizen participation to be lower among deprived or low-income communities, and among marginalised groups such as ethnic minorities, and disabled or young people (Burton et al., 2004; Lightbody, 2015). Some of the key barriers preventing these groups from participating tend to arise from costs, access, education, disability, caring responsibilities, or lack of confidence or belief in local decision-making. Access to participation can also be hindered by lack of inclusion and recognition of barriers communities face from the part of local authorities and partnership organisations (ibid.). It is suggested that better involvement of particular citizen groups requires building relationships in local communities and improving accessibility and transparency of decision-making structures. The latter may imply for example providing training and plain language reporting, and possibly creating initiatives targeting specific population groups (Burton et al., 2004).

While the localism act aims to enable communities to take over assets such as parks, libraries, this is 'likely to arise only where communities already possess the economic and political resources to do so' (Hancock et al., 2012, p. 354). Therefore, the government's approach is more likely to benefit advantaged communities already in possession of resources, while socially excluded communities are left to cope on their own. This argument is supported by recent evidence that found affluent areas to have more community organisations and participation, which are also less dependent on state funding, whereas organisations supporting the disadvantaged are most likely to be state-funded (Clifford et al., 2013).

As opposed to the UK governments, the Scottish government has acknowledged, according to Rolfe (2016), that all communities face challenges with some being more vulnerable than others. The Scottish government can be said to have adopted a more 'grounded' approach, compared to the Coalition's approach, which contains many ambivalences and more responsibilisation. For example, its funding streams in the Community Empowerment Action Plan do not demand matching by funds from donations unlike the Coalition's foundation, which aims to incentivise communities by requiring matching but ignoring lower levels of charitable giving in poorer communities (Rolfe, 2016). Authors have argued that the Scottish policy highlights the importance of the voice of communities in delivering services where it could be more effective while working with the government. In contrast, the approach taken by the Conservative-led administration has been critical of public services and state intervention, relying on the assumption that communities can gain power with a retreat of the state, placing more responsibility onto communities to take over services (Rolfe, 2016; Lowndes & Pratchett, 2012).

## 3.6 Summary of the literature review

This section summarises the literature reviewed in Chapters 2 and 3 synthesising the key arguments discussed. Drawing on literature from the field of neighbourhood effects, Chapter 2 identified local services as part of the neighbourhood context that can affect individuals' opportunities. Then, Chapter 3 focused the discussion on the geographical distribution of local services and considered local services as a social justice issue. The two

literature reviews therefore complemented each other and allowed this thesis to place local services within a framework of neighbourhood inequalities.

Chapter 2 began by presenting key arguments and evidence in neighbourhood effects literature, which has provided rationales for the theory around socially mixed neighbourhoods and posits that spatial concentrations of poverty and deprivation act to compound individuals' social exclusion. The field of neighbourhood effects emerged out of the interest to study the detrimental impacts of the spatial concentration of poverty. Using evidence from this field, social mix policies have relied on the assumption that diversifying the socio-economic composition of neighbourhoods will provide a host of economic and social benefits to disadvantaged residents. In the UK, the goal of reducing social exclusion through creating social mix became a central policy focus of The New Labour government (SEU, 1998; ODPM 2003; 2005b).

Section 2.1 discussed the social-interactive and institutional mechanisms assumed to influence negative outcomes and are therefore addressed by social mix initiatives. Social-interactive mechanisms imply that living and socialising among other disadvantaged individuals detrimentally affects life chances. Critical views were presented on the underlying arguments behind these mechanisms that some have considered part of a 'culture of poverty' (Murray, 1994), which was in further sections found to feature in discussions on social mix policy (2.3.1) and attitudes on social renters in mixed areas (2.5.2). The presence of social-interactive mechanisms is reflected in social mix policy through an emphasis on the positive impacts for disadvantaged residents from socialising with middle-class residents. As key institutional mechanisms that may influence neighbourhood disadvantage were identified neighbourhood reputation and local service provision. Areas that consist of a social mix are assumed to improve external perceptions of the neighbourhood and provide a more sustainable basis for service provision, among other aspects (e.g., ODPM, 2005b; Galster, 2012).

Section 2.2 discussed the issues in operationalising neighbourhood effects research. Challenges in measuring the multiple contextual influences on individual outcomes have partly meant that evidence on the impact of neighbourhoods has remained inconsistent (e.g., Van Ham & Manley, 2010;

Cheshire, 2007). Despite this, some studies using advanced techniques have found support for the presence of negative effects, which has led some to state that the neighbourhood context can condition the resources and opportunities an individual has access to (Oreopoulos, 2003; Ostendorf et al., 2007; Briggs et al., 2010; Hedman, 2011; Galster et al., 2007). Nevertheless, multiple writers have reasoned that neighbourhood characteristics are not the source of individual disadvantage (Bolster et al., 2007), and that area-based policies will not tackle the causes of socio-economic inequality (Cheshire, 2007; Lupton, 2003; Lupton & Tunstall, 2010; Kleinman, 2000). These criticisms are therefore pertinent to the question on the ability of social mix policies to address potential negative impacts of deprivation.

Section 2.3 further outlined the key characteristics of social mix policy, which in the UK has been developed through tenure diversification. Social mix policies have mainly focused on introducing owner-occupation into neighbourhoods dominated by social renting, as a way of attracting middle-class households into low-income areas (Rowan, 2015; McIntyre & McKee, 2009). Therefore this section presented evidence base for the argument that expected outcomes from mix rely largely on the proposed benefits of middle-class owner-occupiers.

A core argument for social mix centred around its potential to increase levels of social capital, which New Labour's neighbourhood agenda gave prominence to. Importantly for this research, higher levels of social capital are anticipated to help residents to work collectively to influence service provision (Lupton & Tunstall, 2008; Lawless et al., 2010; Bond et al., 2011). Therefore sections 2.4 and 2.5 focused on social capital and evidence around the expected impacts of social-interactive mechanisms on individuals and communities. Section 2.4 was devoted to the prominent theories on social capital, which derive from Putnam (2001), Coleman (1988), and Bourdieu (1986). A closely related concept, collective efficacy refers to the ability of a community to address issues and participate in collective action (Sampson et al., 1997; Carrière, 2016). Therefore this concept allows this study to distinguish the notion of collective organisation in neighbourhoods, which policy initiatives have aimed to address under the themes of social capital and community empowerment (ODPM, 2005; Scottish Executive, 2002a).

Section 2.5 discussed the evidence around the potential of socially mixed communities to influence individual outcomes through social-interactive mechanisms. It emerged from studies regarding the intended outcomes from social networks that while the aims of social mix are ambitious, substantial improvements for disadvantaged residents have been difficult to identify (Cheshire; 2007, Joseph, 2006; Page & Broughton, 1997). This section highlighted that while neighbourhoods may host different types of social capital, policies have tended to encourage bridging type of capital in order to expand the social networks of residents in low-income areas. However, as summarised in this section, the intention of mix initiatives to promote social interactions among residents from different socio-economic backgrounds often remains unfulfilled. The evidence is further inconclusive as to whether social capital and collective efficacy are perceived higher in mixed areas because of owner-occupiers who tend to be more active in community organisations, or whether their presence encourages others to participate.

The discussion in sections 2.3, 2.4, and 2.5 argued that interventions that focus on increasing home-ownership rely on the assumed ability of owner-occupiers to engender social cohesion and share their social capital for the benefit of lower-income residents. By assuming that home-owners will assert more social control in the area, policy discourses have presented owners as responsible and beneficial to the rest of the residents (McIntyre & McKee, 2009). The discussion has emerged in connection with the approach that considers the problems of low-income neighbourhoods to derive from behaviours and cultures, and seeks to address them through the introduction of middle-class social norms (Bauder, 2002; Slater, 2013).

The scarce evidence on the effectiveness of mix in influencing individual outcomes has led critics to discourage using tenure mix as a tool in alleviating the effects of deprivation. As many have argued, tenure mix policies place primacy on the social fabric of neighbourhoods as a means to try to alleviate effects of structural disadvantage (Cole & Goodchild, 2001; Cheshire, 2007; Lee & Murie, 1999). This approach emphasises the responsibility of communities and individuals to seek to improve their outcomes through social resources, while understating the pervasiveness of inequalities transmitted through labour and housing markets. The evidence therefore puts into question

area-based policies more widely, and implies that "[m]ixed neighbourhood policies help divert attention from the need for effective policies to tackle poverty which would include income redistribution." (Cheshire, 2007, p. *x*).

A further key argument for mixed areas has focused on the improvement of local services, which was highlighted in section 2.5.3. Research on the impact of area redevelopment has more uniformly found improvements in neighbourhoods' local services compared to outcomes from social interactions (Groves et al., 2003; Bond et al., 2013; Kearns & Mason, 2007). Therefore some authors have contended that evidence on the benefits of mix initiatives is more convincing in regards to improvements in the physical elements of neighbourhoods such as local services (Joseph, 2006; Cheshire, 2007). The role of social mix in influencing service provision is further interesting if we consider that mixed areas are likely to be composed of households with very different needs. However, the association of social mix and local services has received less attention in academic research, and fewer researchers have considered the issue in the context of middle-class influence (Hastings & Matthews, 2015).

Following the discussion on local services through a social mix perspective, Chapter 3 turned to discussing the role of local service provision in social welfare and the geographical distribution of local services. Section 3.1.1 reviewed key notions in the literature on urban public services that has underscored the redistributive aspect of service provision, pointing out the importance of access to local services as a resource to households. Subsequently, section 3.1.2 reviewed possible criteria in resource allocation that have been applied in the objective of spatial equalisation of public services in the UK. In turn, section 3.2 drew on evidence that has discovered geographical imbalances in the provision of services between deprived and affluent areas (Bramley, 1997; Bramley & Besemer, 2011; 2016). In light of this research evidence, the success of area-based social mix initiatives to address structural imbalances in service provision can be questioned, although the subject remains somewhat under-researched.

Chapter 3 also extended the knowledge on the potential influence of middle-class home-owners over local service provision by pointing out evidence around the systematic advantage in public services for this group in section 3.3.

Literature has been established that the middle classes gain more service resources as both the result of structuring of welfare policy and a bias from service providers (Goodin & LeGrand, 1987; Gal, 1998). In addition, researchers have argued that the middle classes are better able to negotiate with service providers and assert their demands as a result of their cultural capital (Hastings & Matthews, 2015). However, it is not clear what the impact of an increase of middle-class residents is on local services in redeveloped and mixed areas.

Drawing on evidence from the fields of neighbourhood effects, social mix, and social capital, three key mechanisms in relation to the role of owner-occupiers in mixed areas and local services can be identified:

- Economic capital: the higher income levels of middle-class residents are likely to help sustain local businesses and private services.
- Cultural capital: services in mixed neighbourhoods can benefit from the cultural capital of middle-class home-owners, which allow them to engage with service providers and local authority officials and exert demand and pressure towards them.
- Social capital: owner-occupiers encourage collective efficacy in mixed neighbourhoods by increasing levels of social capital and being active in collective organisations to help communities to influence service provision.

Section 3.4 discussed the neighbourhood renewal agenda and public service reform of the New Labour government, which the current research will investigate. First, section 3.4.1 overviewed New Labour's joined-up, area-based approach to address issues related to the social exclusion of neighbourhoods, including local service provision. Section 3.4.2 discussed New Labour's public service reform, which involved higher expenditure on public services, while its further measures to improve service delivery included a partnership approach and greater use of private funding.

As described in section 3.4.3, social capital was proposed as a policy tool by New Labour to encourage individuals in disadvantaged areas to become more self-sufficient and assume an active role in improving their skills and self-esteem through for example taking up volunteering (SEU, 2001; Levitas, 1998).

This focus reflects the adoption of the definition of social capital put forward by Putnam (2000) which highlights active citizen participation, as this is considered a means to an end in economic outcomes for individuals and communities (DeFilippis, 2001). In this way, policy can appear to value forms of social capital that are more prevalent in affluent, middle-class neighbourhoods and are enacted through more formal participation and collective efficacy (e.g., Kleinhans et al., 2007; Feeney & Collins, 2015). The policy focus on social capital as a means of improving skills and engaging in citizen action can be found to bear notions of the 'cultures of poverty' discourse, implying that residents in deprived neighbourhoods should engage in behavioural change and adopt more mainstream social norms to improve their outcomes (Levitas, 1998; Watt & Jacobs, 2000). Therefore an underlying rationale for social mix that emerged from the literature review expects middle-class home-owners to act as role models in low-income areas to encourage responsible behaviours and more community-oriented attitudes (Lupton & Fuller, 2009; DETR, 2000).

New Labour's emphasis on social capital also featured in their specific approach to local services, which expected higher levels of social capital to help community organisations work in partnerships with service providers and participate in the production of services (Kearns, 2003; Kleinman, 2000; Lupton et al., 2013a). In this way, Labour's approach aimed to provide community groups more say in service delivery at the same time as it extended measures that were based on consumer choice in public service reform and (Needham, 2007; Durose & Rees, 2012). This aspect has raised concerns particularly for a couple of reasons as was discussed in section 3.4.3. The push for community empowerment in relation to service provision is likely to deepen neighbourhood inequalities in service provision, as neighbourhoods differ in their capacity to influence decision-makers (DeFilippis, 2001; Purdue, 2001; Rolfe, 2016). Critique has further addressed the insufficiency of local-level participation to compensate for underfunded services in disadvantaged areas and the understatement of need for better redistribution of state support (McCulloch et al., 2012; Cheshire, 2007).

The final section, 3.5, discussed implications of policy developments after New Labour. After 2010, funding of most public services has been reduced and local

authorities have faced cuts to their budgets. These developments can be considered as a reversal of New Labour's efforts, as they are likely to deepen geographical inequalities in service provision (section 3.5.1) (IFS, 2015; Hastings et al., 2015). Section 3.5.2 related the community empowerment agenda of New Labour to the localism agenda of post-2010 governments, which has further increased the emphasis on the role of communities in running public services and acquiring public assets. This agenda has emerged alongside with the idea of 'citizen empowerment' through social capital both to promote self-help and to encourage community involvement in decision-making (Hastings & Matthews, 2015). However, austerity measures have meant significant cuts to local authority budgets, which have disproportionately affected service delivery in deprived areas (Hastings et al., 2015).

# 4 Data and methods

This Chapter outlines the methods used in this study as well as the general aim and research approach. It discusses the sources for data obtained to meet the research objectives, identifying strengths and limitations of the approach. This Chapter sets out the analytical methods used in general terms. Further details for each analysis are presented with the relevant findings Chapter.

## 4.1 Research aim and overall approach

### 4.1.1 Research aim and research questions

The overarching aim of this thesis is to examine the associations between social mix and perceptions of local services at the small area level. The literature review identified local services as part of the neighbourhood context that can impact on individuals' opportunities. Following this, the improvement of services in deprived areas has featured in social mix policies in the UK (SEU, 2001; ODPM, 2003; 2005b; Tunstall, 2003). The notion that social mix will provide a host of positive outcomes to neighbourhoods relies to a large extent on the assumed benefits gained from the introduction of owner-occupied housing. The literature has identified some key mechanisms through which the presence of owner-occupiers may benefit local services. The increase of owner-occupiers could provide a boost of income to the local area and create more demand for commercial services (*economic capital*), while owner-occupiers have also been found to be more demanding and effective in seeking service improvements (*cultural capital*) (Chaskin &Joseph, 2010; Atkinson & Kintrea, 2000; Hastings et al., 2014). Importantly, social mix is aimed to increase levels of *social capital* which would help residents to organise collectively to influence the provision of local services (Lawless et al., 2010). The literature further highlighted that social mix was a prominent goal in the neighbourhood renewal initiatives of the New Labour government (1997-2010), intended to address local services along with the public service reform. The policies of New Labour further emphasised social capital as a resource for disadvantaged communities to improve their economic outcomes and for communities to build partnerships with local service providers (Imrie & Raco, 2003; Levitas, 1998; Lupton & Tunstall, 2008).

The question of local services is particularly interesting in the context of social mix and social capital. While it has been found that middle-class residents tend to have more influence over service provision, it is not clear whether possible benefits gained through middle-class social capital would be distributed to low-income residents in the neighbourhood, as households differ in their service use and needs. Further, research has remained inconclusive as to what level of mix would be appropriate to achieve positive outcomes for local services. As the literature points to possible differences in outcomes regarding services for households as a result of social mix, it is considered important in this study to measure residents' perceptions of service access to and quality to identify different patterns according to household characteristics rather than use objective indicators of service performance. Secondly, the study addresses the question on the appropriate level of mix by defining different types of mixed neighbourhoods.

To achieve the overall aim, this study specifically investigates small-area variations in the perceptions of local services according to levels of tenure mix, after controlling for differences in residents' social status and area deprivation. In line with policy initiatives, the first research question focuses on whether the access to and quality of local services are perceived to be better in mixed areas compared to other areas. As policies during the New Labour period aimed to narrow differences between areas, the second question concerns comparisons of the service outcomes (perceived access and quality) over the time period. Finally, the third research question examines the contribution of social capital to the outcomes. The research questions are as follows:

1. Are the access to and quality of local services perceived to be better in more mixed areas?
2. Did area differences in service access and quality reduce during the New Labour period?
3. Does area social capital help to explain variations in the perceived access to and quality of local services?

The research questions are addressed in the following order. The first stage of the analysis constructs measures of neighbourhood social mix, which allow this

study to examine variations in the service outcomes in relation to different types of tenure mix in further chapters. This relates to the aim stated in Research Question 1 to compare outcomes between areas with varying levels of mix, and this comparison is carried through the subsequent analyses. The second stage addresses Research Questions 1 and 2 through statistical modelling of the relationship between the types of tenure mix and local service outcomes found in survey data. Research Question 3 examines the contribution of social capital to the local service outcomes in two parts: first by extending the initial models to include social capital in the survey data, and finally constructing estimates of small areas' social capital from an external data source and linking them to the analysis of service outcomes.

### 4.1.2 **The quantitative approach**

The approach taken in this thesis consists of applying quantitative methods to address the research questions. Statistical methods are used in social research to observe patterns across populations and identify developments through time with the aim to find significant associations and potential causal explanations for phenomena (Murnane & Willett, 2011; Lewis-Beck et al., 2004). A quantitative approach is therefore suited for the aim of explaining variations in perceptions of local services across small areas. The method allows this study to obtain a representative national coverage of the topic, which makes the results more generalisable compared to a qualitative approach, which would limit the study to fewer locations using a small, non-representative sample.

The choice of method is further motivated by the historical perspective expressed in Research Question 2. Statistical information on the service outcomes from the earlier and later time periods are available through contemporary survey data collections. Approaching the topic by conducting interviews in the present and asking people to provide a convincing picture of the past situation would introduce all the risks of recall error and bias.

It is however recognised that a qualitative approach would bring certain benefits to the treatment of the topic albeit by addressing slightly different research questions. As qualitative research takes an interpretative position

regarding the reasons behind behaviours and attitudes (Lewis-Beck et al., 2004), a qualitative enquiry into the relationship between social mix and local services would be better positioned to assess which aspects of the neighbourhood contribute to respondents' perceptions of services and how social mix might influence these. Further, a case study approach focusing on a few areas could review evidence on how social mix in a specific area came about, and reflect on the different implications of this change for the levels of service provision. Nevertheless, despite not collecting qualitative evidence, the quantitative approach of this study is motivated by theoretical assumptions in predicting outcomes, and the conclusions from this study concerning the relationships between variables are related to previously established theory and empirical evidence (Murnane & Willett, 2011). Potential limitations of the approach are returned to in further sections.

### 4.1.3 The use of secondary and cross-sectional data

To address the research objectives, the study uses secondary data, which has some key advantages for the purposes of this study. As noted above, the datasets provide large representative samples of the population, improving the generalisability of results and the data collected allow this study to investigate the two time periods in question. Furthermore, using data from a secondary source provides this study power from fairly limited resources as it avoids undertaking costly and time consuming primary data collection – an important issue for a PhD study.

To successfully address the research questions, however, it was necessary to go through a lengthy process to secure permissions from the data owner to combine data from a number of different sources. In particular, it was necessary to add on to the main survey dataset a range of neighbourhood contextual measures to capture neighbourhood social mix and social capital. These came from the Census and from a second household survey. While Census datasets are freely available, it was necessary to acquire both survey datasets under special licence agreements, as the linkage introduced additional risks of disclosure.

Nevertheless, it is recognised that the use of secondary data imposes some limitations on the design of the study. The use of secondary data in research inherently limits the choice of variables and, effectively, which outcomes are studied. As will be discussed below, the survey questions on local services are not entirely consistent with regards to the services covered or the aspects of the services covered. However, the secondary datasets acquired provide appropriate variables which allow the study to address the research questions, and it is considered that the data fit the research objectives. As the main dataset required a special licence, the procurement of the data was a long process due to constrained resources on the part of the data providers. This resulted in us making the decision to use fewer survey waves of the SHS than originally planned.

A further limitation comes from the use of cross-sectional data in relation to the research objective of looking at change in the service outcomes over time. All the data consist of cross-sectional samples, where respondents have been surveyed at one point in time. While it is possible to compare the results from the two time periods where we have consistent variables, cross-sectional data restricts the ability to reach stronger conclusions on the potential causal mechanisms behind the findings. As pointed out in the literature review, advanced neighbourhood studies prefer to rely on longitudinal studies, which follow individuals through time and therefore improves the evaluation of causal effects. Crucially, longitudinal measures help to control for selection effects, which in our case might derive from the self-selection of individuals into certain neighbourhoods leading to associations between an area and the outcome (Van Ham & Manley, 2010; Murnane & Willett, 2011).

Few surveys collect longitudinal data on social issues in Scotland, with the exception of the UK-wide *Understanding Society*[2] which was considered in the early stages of this study. While *Understanding Society* covers some questions on local services and social capital, it provides a considerably smaller sample for Scotland, which would affect our ability to provide sufficiently accurate

[2] https://www.understandingsociety.ac.uk/ [Accessed 06/04/2019]

estimates of relationships. Therefore the study uses cross-sectional waves of data to compare results at two time points.

## 4.2 Data sources and key measures

The study uses data from three sources which are described in relation to the measures obtained from each below. First, measures of neighbourhood social mix are formed using data from Scotland's Census. The main outcome variables concerning perceptions of local services are obtained from the *Scottish Household Survey* (SHS), along with a range of individual and household characteristics including perceptions of neighbourhood social capital. The third dataset is the *NHS Greater Glasgow and Clyde Health and Wellbeing Survey* which is used to provide additional independent measures of social capital for neighbourhoods in the Greater Glasgow region. The linkage of these datasets is explained in the last part of this section.

### 4.2.1 Census data

The first empirical chapter (Chapter 5) constructs measures of neighbourhood social mix from Census data for the purposes of further analyses. The measures are based on variables derived from Census statistics on household tenure. As noted in the literature review in Chapter 2, tenure has been commonly used to operationalise social mix in research, while policy interventions particularly in the UK discuss diversification in terms of tenure (e.g. Tunstall, 2003). The variable tables are derived from Scotland's Census online database[3], which provides counts of the number of households in each tenure within small areas. The variables are derived at two time points, 2001 and 2011, coinciding with the early period and the end of the New Labour government. The Census data is examined at two area levels in order to link it to further analyses; data zones, which comprise 500-1000 residents, and intermediate zones, comprising 2500-6000 residents. Section 4.2.4 further explains the data linkage process.

The measures are constructed using cluster analysis, which groups together areas that are similar to one another in their tenure composition. Cluster

[3] https://www.scotlandscensus.gov.uk/ods-web/data-warehouse.html [Accessed 06/04/2019]

analysis is an efficient method to summarise patterns in large amounts of data, being particularly useful for this study in allowing us to construct a typology of neighbourhoods (Everitt et al., 2011). While common measures of mix use direct proportions of tenure types or indices of mix on a single scale, a typology provides a more descriptive measure of mix which enables us to capture qualitative differences in the form of mix, not just the level. At the same time, the typology can be related to different levels of mix so effectively capturing both. The method is presented in detail in Chapter 5, where alternative approaches are also discussed.

The Census is also used to calculate a density measure in regression models in section 7.4. The density of small areas is derived from Census population counts for data zones, which are joined to freely available land area data from Scottish Neighbourhood Statistics.

### 4.2.2 Scottish Household Survey

*Survey design and content*

At the core of the analysis is data from the Scottish Household Survey (SHS). The SHS provides a large representative sample of the population in Scotland through repeat cross-sectional surveys which have been carried out for the last 20 years.

This study uses data from four waves of the SHS over seven years, consisting of cross-sectional samples conducted in 1999-2000, 2001-2002, 2009-2010, and 2011. The datasets were chosen to coincide with the early and late periods of the New Labour government, coming to power in 1997 and finishing in 2010. As the first two waves of the SHS were conducted between 1999 and 2002, it is expected that possible changes attributed to the change of government would not be reflected in perceptions of local services particularly under the devolved Scottish Government. Therefore the early data is considered appropriate to represent the situation prior to the influence of the public service reform and neighbourhood initiatives of New Labour. In turn, possible effects can be assumed to have occurred over the ten-year period, being reflected in the three years of data for 2009-2011. It would have been preferable to use the full range of survey years but resource constraints within Scottish Government,

the data owner, meant they were unable to supply a greater number of years with the geographic identifiers which permit the linkage of neighbourhood contextual variables on social mix and social capital.

Two study waves at each end of the time period in question are combined to obtain larger sample sizes and to include more questions on service outcomes in the first period, as reflected in Tables 4.1, 4.2, and 4.3. Tables 4.1-4.3 summarise the variables included in each survey wave. Ideally, the study would have hoped to obtain more years of data but the resource constraints from the data provider meant that this was not possible.

Local services are a core part of the survey, which is designed to cover a wide range of topics overall on the characteristics of households and the views of individuals on issues such as neighbourhood conditions, education, and local government with the aim of informing policy in a number of different areas (e.g., Martin & Hope, 2001).

The SHS is designed to provide an effective sample size from larger local authorities each year and all local authorities over two-year periods. The sampling of households consists of a complex survey design which uses both unclustered and clustered random sampling. Surveys conducted 1999-2002 used a slightly different sampling method compared to the surveys 2009-2011. In 1999-2002, for areas of high population density the survey stratified postcode sectors using a geo-demographic indicator (Scottish MOSAIC) in and took a random sample within each selected sector. For local authorities with lower population densities, the surveys up to 2002 clustered sampling through the smaller Enumeration Districts (EDs), with random sampling within each (Martin & Hope, 2001; Hope, 2002). In 2009-2011, the sample was stratified by local authority using the Government's urban-rural classification. Unclustered sampling was used in authorities classified as 'large urban areas' or 'other urban areas' while in other authorities sampling was again clustered (Hope & Nava-Ledezma, 2010; 2011). The surveys achieved response rates between 66% and 69% at each wave (Hope & Nava-Ledezma, 2010).

The individual survey data is weighted to adjust the achieved sample to known age/sex distributions of the populations of local authorities (Martin & Hope, 2001; Hope, 2002; Hope & Nava-Ledezma, 2010; 2011). The analyses in Chapters 6-8 take into account the weighting of individual data and the complex survey design. In addition to weighting, Chapters 7 and 8 account for the nesting of individuals within geographical areas by conducting multilevel modelling.

The interview structure of the SHS consists of two parts in order to provide representative samples of households and of the adult population within them. The variables concerning household composition, income, and housing come from the survey interview with the householder or their partner. After this one adult from the household, which can be the same person as the householder, is chosen at random to complete the second part. This includes the modules on views about local services, as well as topics such as housing change and neighbourhood problems. Therefore the analysis in this study is based on individuals while it also uses some information on the characteristics of their household (Martin & Hope, 2001; Hope, 2002; Hope & Nava-Ledezma, 2010; 2011).

*Local service outcomes*

This study focuses on examining differences in the perceptions of local services, which are a core aspect of the SHS and thereby represented by extensive question modules in the data. The SHS provides three kinds of outcome measure comprised of subjective questions on: Frequency of Use of Services, Convenience of Services, and Satisfaction with Services. Convenience and Satisfaction can be considered to represent the perceptions of access to and quality of services, which are important aspects in light of the concerns with equalisation standards and needs-based provision of services discussed in the literature review (section 3.1 above). Frequency of Use allows the study to distinguish whether individuals differ in their patterns of use of services. The frequency of use of services further reflects need and is assumed to be connected to perceptions of access and quality, as for example easier access is likely to encourage the use of some services, making the item useful to compare with perceptual outcomes.

As this study aims to measure variations in the perceptions of local services with regard to social mix, it will examine patterns across groups of services provided at the neighbourhood level. The survey includes a range of items concerning leisure services and amenities, essential services such as post offices and food shops, and public services, such as street cleaning. While the questionnaires do not specify these as local, the services in question are generally distributed at a small area level, and it can be assumed that most respondents tend to access them within their local area.

Different services are covered in relation to each outcome and the specific services change over time, as shown in Tables 4.2 to 4.4. To reduce the complexity, similar services are combined to form eight summary indices (Table 4.1). These are the main outcome measures used in the regression analyses (Chapters 6-8). Due to the changes in survey content, only six of these indices can be constructed on a consistent basis for both time periods. Two indices cover Frequency of Use of Leisure services, such as sports facilities and libraries, using the four services available at both periods. Another index covers Frequency of Use of Necessities services, consisting of a group of eight private and public services required by most people, but only available for the later period. Indices of Convenience of Services are constructed for both periods using the seven services available consistently. Indices of Satisfaction with four Leisure services are constructed for both periods, using the same consistent subset as for Frequency. Finally, Satisfaction with Public services is measured for the later period only (Table 4.1). As discussed in Chapter 6, we use statistical tests to check that it is appropriate to combine each group of services into these indices i.e. that there are similar patterns of responses for each service in the group. Chapter 6 also explains how the items are grouped together and how they have been transformed for analysis.

Table 4.1 Key outcome indicators and service items included in the SHS 1999-2002, 2009 2011.

| Outcome indicators | Services included | N items | 1999-2002 | 2009-2011 |
|---|---|---|---|---|
| Frequency of Use of Leisure Services | Libraries, parks, museums, sports | 4 | | |
| Frequency of Use of Necessities | Post offices, banks, cash machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, public transport | 8 | | |
| Convenience of Essential Services | Post offices, banks, outpatients, small food shops, doctors, chemists, public transport | 7 | | |
| Satisfaction with Leisure Services | Libraries, parks, museums, sports | 4 | | |
| Satisfaction with Public Services | Health, police, fire, refuse collection, schools, social care, public transport, street cleaning | 8 | | |

In addition to analyses using the combined indices, Chapter 7 produces separate models for the individual service items. Tables 4.2, 4.3 and 4.4 show the survey questions and service items available at each wave for each of the three types of outcome. While there is some inconsistency in the services included in each outcome category (i.e., Frequency, Convenience, and Satisfaction are comprised of a slightly different groups of services), this is not considered problematic as the study does not focus on comparing specific services across different outcomes. The analysis focuses on modelling the perceptual outcomes through indicators for groups of services. When analysing change over time, however, the study always uses consistent groups of services at both time points.

Table 4.2 Service questionnaire items for Frequency of Use by wave.SHS 1999-2002, 2009-2011.

| Question | Frequency of Use | 1999-2000 | 2001-2002 | 2009-2010 | 2011 |
|---|---|---|---|---|---|
| When did you last use or visit each of the following? | Public library | | | | |
| | Public parks and open spaces | | | | |
| | Museums and art galleries | | | | |
| | Swimming pools | | | | |
| | Sports/leisure centres | | | | |
| How often you have you used each of the following council services in the past 12 months? | Public library | | | | |
| | Public parks and open spaces | | | | |
| | Museums and art galleries | | | | |
| | Theatres or concert halls | | | | |
| | Community centres and facilities | | | | |
| | Sports/leisure centres | | | | |
| How often you have you used each of the following council services in the past 12 months? | Post office | | | | |
| | Banking services | | | | |
| | Cash machine or ATM | | | | |
| | Doctor's surgery | | | | |
| | Dentist | | | | |
| | Small amount of grocery or food shopping | | | | |
| | Chemist/pharmacist | | | | |
| | Hospital outpatients department | | | | |
| | Petrol station | | | | |
| | Public transport | | | | |

Table 4.3 Service questionnaire items for Convenience by wave. SHS 1999-2002, 2009-2011.

| Question | Convenience | 1999-2000 | 2001-2002 | 2009-2010 | 2011 |
|---|---|---|---|---|---|
| Bearing in mind where they are and your own circumstances, please tell me how convenient or inconvenient you would find it to use these services during their normal opening hours, assuming you needed to? | Post office | | | | |
| | Bank | | | | |
| | Doctor's surgery | | | | |
| | Small amount of grocery or food shopping | | | | |
| | Chemist/pharmacist | | | | |
| | Hospital outpatients department | | | | |
| | Public transport | | | | |
| | Dentist | | | | |
| | Cash machine or ATM | | | | |
| | Petrol station | | | | |

Table 4.4 Service questionnaire items for Satisfaction by wave.SHS 1999-2002, 2009-2011.

| Question | Satisfaction | 1999-2000 | 2001-2002 | 2009-2010 | 2011 |
|---|---|---|---|---|---|
| I would like you to tell me how satisfied or dissatisfied you are with the quality of each of the following? | Public library | ■ | ■ | ■ | ■ |
| | Public parks and open spaces | ■ | ■ | ■ | ■ |
| | Museums and art galleries | ■ | ■ | ■ | ■ |
| | Swimming pools | ■ | ■ | | |
| | Sports/leisure centres | ■ | ■ | ■ | ■ |
| Overall, how satisfied or dissatisfied are you with each of these council services? | Libraries | | | ■ | ■ |
| | Parks and open spaces | | | ■ | ■ |
| | Museums and galleries | | | ■ | ■ |
| | Theatres or concert halls | | | ■ | ■ |
| | Sports/leisure centres | | | ■ | ■ |
| | Community centres and facilities | | | ■ | ■ |
| Overall, how satisfied or dissatisfied are you with each of these services? | Local health services | | | ■ | ■ |
| | Police service | | | ■ | ■ |
| | Fire service | | | ■ | ■ |
| | Local schools | | | ■ | ■ |
| | Social care or social work services | | | ■ | ■ |
| | Public transport | | | ■ | ■ |
| | Street cleaning | | | ■ | ■ |

*Neighbourhood social capital*

The SHS data is further utilised to gather information about respondents' perceptions of neighbourhood social capital to address the third objective of this study: whether neighbourhood social capital contributes to variations in the perceptions of local services (Research Question 3). This stems from the theoretical assumptions around neighbourhood social capital, which is thought to help local residents to organise collectively in order to influence service provision (Sampson et al., 1997; DeFilippis, 2001). The research question is addressed in Chapter 8 which builds on the initial analysis of local services by adding variables on social capital from two sources, in turn.

The first measures of social capital come from the same samples of the SHS as the local service outcomes. (The second measures come from a different survey as explained in 4.2.3 below.) A few different questionnaire items on the topic of social capital can be found in the SHS (Table 4.5). For the purposes of comparing results over time, there are three questions which ask about informal support from social contacts with neighbours in the form of help or advice. These are combined into a single indicator as explained in detail in Chapter 8.

Additionally, we wish to measure willingness to improve the local area and influence decisions made about the area, which are part of the concept of 'collective efficacy'. A consistent variable in the survey waves in question for this purpose enquires whether respondents have contacted the council regarding various services, which are combined into one indicator (Table 4.5).

Table 4.5 Social capital variables in the SHS by wave, SHS 1999-2002, 2009-2011.

| Question | 1999-2002 | 2009-2011 |
|---|---|---|
| Could rely on friends/relatives in neighbourhood if needed help? | ■ | ■ |
| Could rely on friends/relatives in neighbourhood to watch if home empty? | ■ | ■ |
| Could turn to friends/relatives in neighbourhood for advice/support? | ■ | ■ |
| Contacted council about: refuse/bin collection; council tax; environmental planning; building control; street lighting; street cleaning/dog fouling; road repairs/potholes; pavements; winter maintenance; Trading Standards | ■ | |
| Using the council website for: finding information; downloading a form; making a complaint; asking a question; participating in a discussion forum; | | ■ |

| | | |
|---|---|---|
| access services like reporting a fault or renewing library books; making payment like council tax or parking fine; some other purpose. | | |

*Neighbourhood context*

Lastly, the SHS data comes with one variable which describe the neighbourhood context already attached to the individual records. This is the measure of neighbourhood deprivation from the Scottish Index of Multiple Deprivation. That index is constructed for data zones, the same units used for the Census analysis. The SIMD ranks areas at the data zone level, and this ranking can be aggregated into deciles and quintiles. In the models, quintiles are used in order to avoid including too many parameters into the models. The 1999-2002 SHS data come with the SIMD quintiles from the 2004 update, and the 2009-2011 data are linked to quintiles from the 2009 SIMD. For intermediate zone models, we use the weighted average data zone scores for individuals in that area.

### 4.2.3 NHS Health and Wellbeing Survey

Applying the above social capital variables (Table 4.5) from the SHS means that these assessments are made by the same individuals as are providing an assessment of service outcomes. Therefore the modelling is likely to involve bias derived from unmeasured characteristics of the respondents (e.g. Dietz, 2002), such as a general positive outlook on the area leading to better perceptions of services and social capital. In order to provide an independent check, additional external measures of social capital for each neighbourhood are constructed using data from the *Greater Glasgow and Clyde NHS Health and Wellbeing Survey* which is conducted every three years. These are linked to the SHS data through data zone identifiers, in the same way as the Census data. These data only cover a part of Scotland, but Glasgow is the major urban conurbation so they still a large part of the population across a varied range of urban and more suburban locations.

The NHS data is used to estimate the social capital of data zones in the Greater Glasgow region. A key advantage of the NHS data is that it allows a direct method of estimating social capital for small areas. Here, the direct method refers to the fact that estimates are based on aggregating individual survey responses for each small area (see Twigg et al., 2006), as detailed in Chapter 8. Chapter 8 builds estimates of data zones' social capital applying multilevel modelling, which is discussed in 4.3.2 below. In order to measure the social capital of small areas over time, the approach requires decisions around the appropriate sample size and inclusion of data zones, and a number of data zones are excluded from the models due to low numbers of responses or areas not being represented throughout the survey.

Five cross-sectional samples (2002, 2005, 2008, 2011, 2014) of the NHS data are used for this study, giving a sufficient sample across the time period of interest. The inclusion of multiple waves also allows us to build more reliable estimates of social capital across time. While the NHS survey years 2002 and 2011 coincide with the early and late periods of SHS data, the estimation through multilevel modelling allows us to interpolate and extrapolate data to better correspond to the survey years in the SHS dataset. Taking into account all the survey years allows us to make linear estimates of trends in social capital for each data zone, in order to then calculate the social capital of data zones for the mid-point of the SHS survey years (1999-2002 and 2009-2011, respectively).

The NHS survey is designed to gather information on various physical and social health indicators, and on factors thought to be relevant to health, including social capital, to inform health policy (NHS GGC 2000; 2003; 2005; Traci Leven Research & Greater Glasgow & Clyde NHS Board 2010; 2013; 2015). An indicator for social capital is constructed from seven variables found consistently in the NHS survey years 2002-2014 (Table 4.7). In addition to giving a measure of social capital for the neighbourhood which is independent from the assessments of service outcomes, these questions provide a fuller representation of the concept of social capital compared with the SHS

questions, which were limited to informal neighbour support and council contact. The NHS survey questions touch on bonding capital through mutual support and friendships, as well as trust and feelings of belonging to the area. The survey also contains a question on local influence ("*By working together, people in my neighbourhood can influence decisions that affect my neighbourhood*").

The NHS survey provides representative data on the Greater Glasgow and Clyde region, as the samples have been stratified proportionately to represent areas in every deprivation quintile and each local authority within the region. The interviews were conducted with adults from randomly selected households (NHSGGC, 2000; 2003; 2005; Traci Leven Research & Greater Glasgow & Clyde NHS Board 2010; 2013; 2015). The data are provided in truncated form by the NHSGGC research support team under a license agreement with the researcher.

The linkage of the NHS data into the SHS dataset means that the final dataset for this element of the work is comprised only of small areas in the Greater Glasgow region. While the survey provides consistent measures of social capital for the purposes of this study, the geographical focus of the survey on Greater Glasgow arguably limits the generalisability of results to other Scottish regions. The sample mainly covers urban and suburban areas being more limited in its coverage of the variation of areas in Scotland and the representation of remote towns and rural areas. However, the Greater Glasgow and Clyde region is the largest urban area in Scotland and the results are considered to be applicable to some extent in other similar areas.

Table 4.6 Social capital variables in survey waves of the NHS HWB. 2002, 2005, 2008, 2011, 2014.

| **Social capital variables in the NHS Health and Wellbeing Survey, 2002, 2005, 2008, 2011, 2014** |
|---|
| This is a neighbourhood where neighbours look out for each other |
| I feel I belong to this local area |
| The friendships and associations I have with other people in my local area mean a lot to me |
| I feel valued as a member of my community |

| |
|---|
| Generally speaking, you can trust people in my local area |
| By working together, people in my neighbourhood can influence decisions that affect my neighbourhood |
| If I have a problem, there is always someone to help me |

### 4.2.4 **Data linkage**

The study involves using independent measures of the neighbourhood tenure composition and social capital of small areas, which are linked to the individual-level data on perceptions of service outcomes. The data linkage required considerations around the area level of analysis, timing of data, and consistency of geographic identifiers through datasets. As the main outcome variables are found in the SHS, it forms the main dataset to which the other two data sources would be matched.

The choice of area level for the clustering of observations is informed by theoretical assumptions behind the association of tenure mix and local service outcomes, which suggests that the measurement of local service outcomes should be undertaken at two area levels. The modelling of service outcomes is undertaken primarily on data zones, which are comprised of 500-1000 residents[4], based on the assumption that residents are more likely to organise collectively to influence local services at a smaller area level. Meanwhile, it is also recognised that some of the local services included are delivered at larger scales, which leads us to further undertake the analysis using intermediate areas, containing 2500-6000 residents[5]. Therefore the first empirical chapter carries out clustering of the Census data at these two area levels.

In order to undertake the modelling of the relationship between tenure mix and local services, the resulting neighbourhood clusters from the Census data are added to the main SHS datasets. The SHS datasets were prepared and

[4]https://www2.gov.scot/Topics/Statistics/sns/SNSRef/odpplookup [Accessed 28/03/2019]

[5]https://www2.gov.scot/Topics/Statistics/sns/SNSRef/odpplookup [Accessed 28/03/2019]

provided for this study by the Scottish Government SHS Team by special request, as the research required the inclusion of small-area identifiers for the data zone in which each respondent lived; data zones nest within intermediate zones so both can be identified in this way. Special permission was required as the resulting dataset involves a greater disclosure risk. The study datasets were therefore stored and analysed with a secure Safe Haven service at the University of Glasgow as required by the data sharing agreement.

The clusters based on the 2001 Census clusters are linked to the 1999-2002 SHS data and those based on the 2011 Census are linked to the 2009-2011 data. The data linkage is done using the geographical identifiers for data zones, which are included for each respondent in the survey datasets. The data zones can be aggregated to intermediate zones using look-up tables available from the Scottish Neighbourhood Statistics website[6]. The data zone geographies were updated in 2011 to reflect population changes. For this purpose, the SHS data was also provided using the 2001 identifiers for the early period, and the 2011 identifiers for the later.

Further, linking the social capital estimates from the NHS data to the main datasets allows us to model the contribution of social capital to the service outcomes. The NHS years 2002-2005 are linked to the earlier SHS and the NHS 2008-2014 years to the late SHS data. Each resulting dataset includes the social capital estimates, the SHS, and the tenure clusters for the data zones covered by the NHS GGC data.

With the NHS data, a decision was required concerning the matching of the Census clusters. The NHS data comes with 2001 data zone identifiers for all years from 2002 to 2014. This means that the Census clusters from 2001 could be directly linked to the NHS data, but the 2011 clusters are a more appropriate match with the 2008-2014 NHS data. Therefore the old data zone identifiers in the later NHS data were first ‘converted’ into the new 2011 data zone

[6]https://www2.gov.scot/Topics/Statistics/sns/SNSRef/DZ2011Lookups [Accessed 28/03/2019]

identifiers again using a look-up table[7] that matches the old data zones to the 2011 identifiers based on their best geographical match. This then allowed for the 2011 Census clusters to be added into the 2008-2014 NHS dataset.

## 4.3 Modelling approaches

The main outcomes in this study are analysed through regression modelling as explained in detail in Chapters 6-8. This section outlines in summary form the concepts of regression modelling and multilevel modelling, with the baseline regression model explained in more detail for the purposes of discussion.

### 4.3.1 Regression models

The multiple regression model is the most widely used technique which seeks to establish the relationships between an outcome variable and a set of predictor variables. Models show correlations or associations between variables. However, it is clear that correlation does not imply there being a direct causal link from the predictor to the outcome. Most obviously, variables which have not been included in the model (omitted variables) may confound the relationship under scrutiny if they are prior causes of both the outcome and the predictor variables (Lewis-Beck et al., 2004). It is also possible that 'outcomes' are actually the cause of 'predictors' rather than the other way around.

Much of the modelling in the results chapters focuses on a small number of composite outcome indicators, constructed from answers to a set of questions on different services. As these can be considered effectively continuous variables which can take a wide range of values, regression models of the relationship between household predictors and service outcomes use the linear specification of the regression model. The linear regression model is a model

[7] https://www2.gov.scot/Topics/Statistics/sns/SNSRef/DZMatchingFile [Accessed 28/03/2019]

that measures the outcome (dependent variable) as the linear function of one or multiple predictors (explanatory variables):

$$y_i = \beta_0 + \beta_1 x_i + e_i$$

This linear regression states that the outcome $y$ for an individual $i$ is a linear additive function of the intercept $\beta_0$ (the expected value of $y$ when all predictors have a value of 0), the predictor $x$, and an error term or residual $e$. The subscript $i$ =(1,… n) denotes the observation number or individual. A multiple regression equation includes more than one predictor variable.

The residual is the difference of the observed $y$ value for an individual from that expected given the relationship between $x$ and $y$ in the sample as a whole. Residuals are assumed to be normally distributed with a mean of 0 and variance $\sigma^2$. The variance summarises how individual observations are distributed after controlling for the observed factors, $x$, i.e., the unexplained variation.

The model aims to estimate the regression coefficient $\beta_1$, the relationship between $x_i$ on $y$. It does this by fitting a straight line onto the observations of $x_i$ and $y$ to obtain estimates for the values of $\beta_0$ and $\beta_1$ using the method of ordinary least squares (OLS). This method aims to minimise the sum of squared errors which are derived from the differences between the observed values and the predicted regression line, or predicted values (Lewis-Beck et al., 2004; Tabachnik & Fidell, 2014).

In addition, Chapter 7 constructs models for individual services where outcomes are recorded using ordinal scales with a limited number of response categories. Treating these as linear scales would be inappropriate. In these cases, the thesis uses cumulative logit models. Full details are provided in Chapter 7.

### 4.3.2 **Multilevel modelling**

The combination of area-level and household-level data in this study requires the use of multilevel or hierarchical models, which allow us to account for the nesting of individuals in small areas (Chapters 7 and 8). Multilevel modelling often refers to a set of techniques, and we will discuss those relevant to the current study, which are also commonly used in neighbourhood research.

Multilevel modelling allows us to examine research questions on the relationships between area-level variables and individual outcomes, e.g., whether neighbourhood tenure mix is related to residents' perceptions of services. Area-level predictor variables are included in the analysis beginning from Chapter 7. The data are then organised at two levels; individuals (level 1) and neighbourhoods (level 2). We are interested in the characteristics of this nesting of individuals within neighbourhoods, as they share neighbourhood conditions. This means that the observations from individuals are not entirely independent from each other, which makes the error terms of individuals from the same neighbourhood correlated. This violates one of the core assumptions of the standard linear regression model. Neighbourhood studies generally see this dependency as derived from sharing the same physical or social environment, making individual outcomes more likely to be similar for those people sharing the same environment(s) (Dietz, 2002; Snijders & Bosker, 1999; Tabachnik & Fidell, 2014).

If the grouping of level-1 units is not taken into account and observations are treated as independent (when there actually is a level-2 grouping), the standard errors of regression coefficients will be too narrow, and p-values therefore too small (Steele, 2008). This may lead to type 1 errors, i.e. concluding that there is a difference between level-1 units while this relation does not hold in the population (because the observations were grouped at level-2). Techniques such as robust standard errors can be used in single-level regression to adjust for the nesting of individuals when the number of groups is not too large (Snijders & Bosker, 1999). However, the multilevel approach

truly accounts for the two-level structure of observations and allows for variation among groups to be estimated. The multilevel approach is appropriate in this study while using datasets comprised of hundreds or thousands of small areas (level 2 units).

*The specification of multilevel models: the random intercept model*

Multilevel models are an extension of the OLS regression model. The idea is that the mean of *X* (an explanatory variable) may differ from group to group, often leading to positive between-group variance in *X* (Snijders & Bosker, 1999). Two types of regression model are referred to in this section as random models: random intercept and random slope models. To address the research aims, this study uses random intercept models. In the random intercept model, the between-group variability is modelled by letting the intercept of the group regression line vary across groups. A key advantage of random models is the partitioning of the total variation into within-group and between-group variation, allowing us to observe how much of the variation is explained by the group-level of interest. The random intercept model is specified in the linear form as:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + u_j + e_{ij}$$

Compared to the OLS model, the random intercept model estimates $y$ and the coefficient $\beta_1$ for individual *i* in group *j*. The intercept for group *j* therefore consists of the average intercept across all groups, $\beta_0$ and the group-dependent deviation, $u_j$.

Random effects models (random intercept and random slope) separate the error term (i.e., the unexplained variance) into individual-level residuals, $e_{ij}$ , and group-level residuals $u_j$, and individuals in a group share the same group-level residual. Both residuals are assumed to be distributed independently of each other and randomly drawn from a population with population means at 0 (Snijders & Bosker, 1999). It is generally considered that non-normality of the

residuals may lead the model to produce unreliable results (Snijders & Bosker, 1999), while some have considered the normality assumption for $u_j$ desirable but not essential (Clark et al., 2010).

In turn, random effects models make a further important assumption that requires consideration regarding the type of data. The group-level residuals are assumed to be uncorrelated with other individual or area-level predictors (covariates). This means that unobserved characteristics of the area that influence the outcome, in our case, perceptions of services, should not be correlated with areas' or residents' characteristics included in the model. In this study, unobserved variables could comprise for example the funding available for local services. If the assumption referred to as the random effects assumption cannot be fulfilled, the model risks producing biased results (Firebaugh et al., 2013; Clark et al., 2010). However, in social research there is rarely an ideal situation where unobserved characteristics do not bias the model, and different techniques have been suggested to adjust for unobserved variable bias, such as the fixed effects approach detailed below.

A further advantage of random models is that they allow for the smaller sample sizes of some groups by producing shrunken estimates of group means. The accuracy of the estimate of the group mean is affected by the sample sizes of the group (or area). Where the sample size of a groups is small or the within-area variance is large relative to the between-area variance, the estimate of the group mean $u_j$ are 'shrunk' towards to overall mean, $\beta_0$. Thereby, estimates based on a small number of responses from an area are not given undue weight. While random effects models provide estimates closer to the overall mean than the 'true' random intercepts of groups, the estimates are more reliable for small groups having a smaller prediction error variance and producing smaller confidence intervals compared to OLS estimates. This method is also called Empirical Bayes prediction (Steele, 2008).

The random intercept model allows the intercept to vary for each level-2 unit and assumes that the effect of a covariate is the same for each level-2 unit or

area. An extension of this is the random slopes model which additionally specifies a different regression line, or slope for each group or area. The slope for a group is predicted by the overall average slope and the deviation from the average slope for group *j*. The same assumptions on the normality of the random effects hold.

Random slopes can be used where the relationship between for example individual characteristics and the outcome is assumed to vary for each area. A drawback is that random slopes produce larger standard errors thereby reducing prediction power on the relationship between predictors and outcomes (Tabachnik & Fidell, 2014). For the purposes of this study, random intercept models are considered the appropriate approach (Chapters 7 and 8), as the relationships between predictors, such as individuals' demographic characteristics, and the service outcomes are considered constant across small areas.

*The choice between fixed and random models*

For the modelling of service outcomes, this study uses a random effects modelling approach, but it is worth considering the merits of the alternative fixed effects model. Fixed effects models can be used to avoid omitted variable bias as they control for measured and unmeasured individual and neighbourhood level characteristics (Van Ham & Manley, 2010). The fixed effects approach sees the level-2 or area characteristics as a nuisance to be controlled for, rather than a question of interest. Therefore, fixed effects are appropriate where the question of interest is in a level-1 outcome and the variation at level-2 needs to be controlled for. The (level-2) variables are 'fixed' for each individual as their effect is assumed to be similar across all the included predictors (Murnane & Willett, 2011; Steele, 2008).

Fixed effects can be estimated through OLS models. A common approach in a fixed effects model is to include the intercepts as a set of dummy variables, i.e. the area variables as predictors similarly to a single-level regression model.

Another approach is to 'difference out' area effects by subtracting the area means of the outcomes and predictors from both $y_j$ and $x_{ij}$ (Clark et al., 2010). The dummies control for all observed and unobserved differences between the groups that do not vary with time, therefore this does not leave unexplained between-area variation which could be explained by level-2 variables.

An advantage of fixed effects is that the random effects assumption on the group error term $u_j$ is not required. In turn, the key restriction of fixed models is that research questions concerning level-2 variables cannot be examined (Steele, 2008). The dummies absorb all the area-level variation in the outcome, which means that other fixed area-level predictors cannot be included as they will be collinear with the dummies. A further disadvantage with fixed effects is that the inclusion of a large number of dummy variables affects the degrees of freedom, and there will be many parameters to estimate (ibid.).

Fixed effects models typically include a small sample of groups that is treated as a fixed classification, and the population of this sample is of interest to the study. The fixed effects approach does not allow us to make inferences to groups outside our sample, while the random effects approach views the groups in our dataset as a random sample from some population (Steele, 2008).

The use of random models is recommended particularly where level-2 variables are available and where the sample is assumed to come from the population which we hope to draw conclusions for (e.g. Clark et al., 2010; Snijders & Bosker, 1999). The random model approach has been considered superior where the level-2 effects are the central focus of research (e.g., Firebaugh et al., 2013; Clark et al., 2010). This approach is preferred in this study as it allows modelling the effects of area characteristics for different residents instead of considering area characteristics to be fixed.

## 4.4 Summary

This Chapter outlined the research aims and the methods applied to address the research questions. The general aim of the study is to examine the relationship between different types of tenure mix and residents' perceptions of local services, and whether social capital can contribute to variations in the service outcomes. These outcomes are further compared between two time periods to investigate possible changes during the New Labour era.

The study uses data from three sources: data on individuals from the Scottish Household Survey, data on the neighbourhoods in which they live from the Census and data from the NHS Greater Glasgow and Clyde Health and Wellbeing Survey. Constructing a unique dataset from multiple data sources to address the research aim has been a major undertaking for this thesis. First, obtaining access to the survey datasets required negotiations with data owners due to the special precautions to ensure that respondent anonymity remained uncompromised. Secondly, joining separate measures of neighbourhood mix, local services, and social capital has required consideration in regard to the harmonisation and linkage of the datasets. As this Chapter explained, the study uses data collected at the early and the late period of the New Labour government, making the timing of all three datasets coincide to the best possible extent. This allows us to compile datasets including information on the neighbourhood context and on individuals at both time periods. The process of linking the three data sources then involved ensuring that they hold corresponding area identifiers, which in some cases led us to convert area identifiers to match the other datasets.

Furthermore, this study adopts a considered and extensive approach to constructing its key measures. This includes measures of neighbourhood social mix, which are devised specifically for the purposes of the research aim through a cluster analysis of small area data (Chapter 5). Further, indicators for the service outcomes are formed taking into consideration the survey coverage of questionnaire items and consistency across samples (Chapter 6).

As the final neighbourhood measure, the study makes efforts to improve the measurement of area social capital by constructing external estimates of social capital based on survey data from individuals nested in small areas (Chapter 8). Throughout Chapters 6 to 8, the analysis undertakes appropriate treatment of the complex survey design and clustered nature of cases in the analysis by using weights and multilevel modelling.

# 5 Constructing measures of neighbourhood social mix

The aim of this Chapter is to construct measures of neighbourhood social mix, which will be linked to data on local service outcomes in further analyses. Previous evidence on mix has remained without definitive answers on whether social mix improves outcomes, which outcomes, and for whom (e.g., Bond et al., 2011). In particular, it is not clear what level of mix in a neighbourhood would contribute to positive outcomes (Tunstall & Fenton, 2006; Livingston et al., 2013), which this study aims to address by defining a measure for different levels of neighbourhood mix. The measure consists of a neighbourhood typology which allows this study to distinguish areas with different levels and types of mix. This is achieved through cluster analysis on households' tenure type from the Scottish Census. The literature review identified that social mix is often defined as mixed tenure, and tenure diversification has been a key focus in policy. This chapter constructs an area typology, while it discusses alternative measures of residential segregation and mix.

The first section (5.1) overviews the theoretical basis of the clustering methods and summarises some recent applications in research on social mix. Secondly, it discusses issues around area scale identified in research which frame the choice of geographical scale in this study. To justify the approach used, the first part also discusses entropy scores as alternative measures of neighbourhood composition. After this, section 5.2 details the method of cluster analysis applied in this study ahead of the empirical section of this chapter. Section 5.3 provides descriptive analysis of the data, before cluster analysis on data zones and intermediate areas in undertaken in section 5.4. The chapter ends with a summary (5.5).

## 5.1 Measuring neighbourhood social mix through classification

### 5.1.1 Measuring tenure mix

The construction of neighbourhood measures is informed by theory and evidence reviewed in Chapter 2. While research is known to have operationalised social mix as the mix of tenure types, income levels, or other socio-economic indicators, housing policy tends to focus on mixing tenures, as this is a feasible means to introduce mix in terms of income or socio-economic status (Tunstall & Fenton, 2006). Mix policies generally aim to increase owner-occupation in areas dominated by social renting in order to reduce concentrations of deprivation (ibid.). Therefore this study focuses on tenure as the basis for constructing measures of social mix.

Despite social mix being a prominent policy topic, there is not a consistent definition of what constitutes a mixed area (Livingston et al., 2013; Tunstall, 2003). It has for example been suggested that an area would be defined as mixed where no tenure type exceeds 50% (Tunstall, 2003, following Harvey et al., 1997). By this definition, a small number of areas would be classified as mixed as a large majority of areas in the UK are owner-dominated (ibid.). Many studies have defined mix through a one-dimensional measure such as the proportion of a tenure type or the ratio of two tenure types in an area (Baum et al., 2010; Andersson et al., 2007). There has also been a focus on measuring the dichotomy of owner-occupation and social renting, with much of policy discussions referring to this (Graham et al., 2009; Baum et al., 2010; Jupp, 1999; Page & Broughton, 1997; Atkinson & Kintrea, 2001; Scottish Executive, 2002a). However, more recent studies recognise that the increase of the private rented sector should lead to defining mix in terms of the three tenure types (Bailey et al., 2012; Livingston et al., 2013).

There has been interest for more systematic investigation on the measurement of mix, prompted by motivation to produce measures that better fit the

purpose of the study, as well as recognition that the measure used to define mix is likely to impact outcomes (Graham et al., 2009; Livingston et al., 2013; Andersson et al., 2007; Baum et al., 2010). As discussed in the literature review, the field of neighbourhood effects research has been concerned with finding thresholds of given group proportions where the effects start to take place (Galster, 2008; 2012).

Instead of relying on a scale measure of mix, this study hopes to define multiple types of mix in order to examine variations in outcomes according to different levels of mix. This study will therefore construct measures using cluster analysis to classify small areas. Cluster analysis has been applied in the measuring of social mix using UK Census data previously to explore multi-dimensional measures of area composition (Bailey, 2011; Livingston et al., 2013; Vickers et al., 2013). In order to construct a multi-dimensional measure of mix, this study will take into account owner-occupation, private renting, and social renting as the three largest tenure types in Scotland. Compared to proportions or single-scale indices, the method provides a more descriptive measure of mix indicating the composition of areas in relation to all three tenure types.

The construction of bespoke measures of mix is further important for this study in order to examine the pattern of small areas' tenure composition. Available area-level indicators such as Scottish Index of Multiple Deprivation (SIMD)[8] or Carstairs scores[9] are aimed at measuring neighbourhood deprivation, but do not pertain to the social or housing composition of areas. This analysis makes an improvement to the measurement of neighbourhood composition in a second sense. Measures such as the SIMD count deprivation scores from area averages and do not identify individuals or individual households. Constructing measures using Census datasets in turn allows us to take into account all the

[8] http://www.gov.scot/Topics/Statistics/SIMD [Accessed 20/02/2017]
[9] http://www.isdscotland.org/Products-and-Services/GPD-Support/Deprivation [Accessed 20/02/2017]

variation in the population and provides information at appropriate small area levels.

### 5.1.2 Issues around geographical scale

Relating to the discussion in section 2.1 on neighbourhood research, constructing measures of social mix requires consideration around the appropriate scale used in the analysis. The aim of this study is to look at variations in local services at a small area level, and this guides the choice of area level for the cluster analysis. Neighbourhood studies have often measured outcomes at an area level that is thought to correspond to an everyday definition of neighbourhood. However, it is recognised that a 'neighbourhood' may have different meanings for individuals or cross official statistical boundaries (Harris & Langley, 2002; Suttles, 1972). The statistical definition of a neighbourhood is somewhat arbitrary in the sense that it has no intrinsic meaning independent of the population or the physical landscape (Harris et al., 2005). Hence a question arises as to whether area classifications are imposing differences where they do not actually exist, or obscuring 'natural' groupings.

The term 'imposed areas' can be used to refer to arbitrary and modifiable boundaries in analysis. The delimitation of boundaries can in fact affect the results, and this is known as the modifiable area unit problem (MAUP) (Openshaw, 1984, cited in Harris et al., 2005). Census data are collected for households or individuals, but are reported for modifiable statistical units (data zones, LAs) due to the requirements of for example government administration.

Some studies have proposed substituting ready statistical boundaries with ones made distinctly to suit the analysis at hand. Authors have argued for the use of bespoke boundaries in analyses on neighbourhoods in order to counter the issue of predefined spatial units which are not necessarily suitable to the neighbourhood characteristics examined (Johnston et al., 2004; Östh et al.,

2015; Andersson et al., 2007). This responds to the (MAUP) problem of different behaviours being influenced by neighbourhood characteristics at different scales. The choice of area level can in some cases affect the outcome of the study and, in extreme cases, alter the substantive conclusions.

In view of this study, it is recognised that the geographical scale applied to examine the pattern of neighbourhoods' social composition may affect further outcomes. Therefore, the choice of scale must be made based on theoretical assumptions in regard to the outcome, which consists of survey data on local services. While it can be argued that the scale of distribution varies for each service included in later analyses, it is not in the scope of this research to construct bespoke neighbourhood boundaries. The study will rely on existing statistical boundaries as these are used in the survey data which the neighbourhood measures will be linked to. Commonly used statistical geographies available for Scotland are detailed in Table 5.1.

Neighbourhood measures of social mix are constructed at two geographical scales: data zones and intermediate zones. Data zones, holding 500-1000 residents, are considered more likely to correspond to common definitions of neighbourhood and therefore are the primary scale of analysis in further chapters. The choice of the neighbourhood level is based on theoretical assumptions around the mechanisms linking social mix and local services. A key assumption behind social mix is the influence on local conditions arising from the social interaction of residents, which is more likely to occur at a small area level. A further section of the analysis examines the contribution of neighbourhood social capital which would engender collective action for the improvement of neighbourhood services. However, there is a strong argument for using a higher area level, as many public and private services are distributed for areas larger than the data zone. For this reason, neighbourhood measures are also constructed using the next highest level from data zones, the intermediate area level (Table 5.1).

Table 5.1 Statistical geographies available for Scotland. *=for latest year collected.

| Geography | Amount of units (2011) | Population* |
|---|---|---|
| Council area (Local authority) | 32 | approx. 21 000 – 606 000 |
| Electoral ward (Scotland) | 353 | 5500 |
| Scottish Parliamentary Constituency | 73 | approx. 21 000 – 93 000 |
| Health board area | 14 | approx. 17 000 – 886 000 |
| Travel To Work Area | 228 (UK) | min. 3500 |
| Intermediate zone | 1279 | 2500-6000 |
| Data zone | 6976 | 500-1000 |
| Output area | 42 604 | min. 50 |

### 5.1.3 Choice of classification method

Classifications are used for organising and describing patterns in large amounts of data (Everitt et al., 2011). Classification is particularly useful in the analysis of small areas, where it can be used to summarise complex residential patterns based on multiple variables simultaneously, which can then be visualised on a map or used in further modelling.

Techniques for classification have largely increased partly due to the availability of computers capable of large amounts of arithmetic. Numerical classification techniques were derived from natural sciences with the aim to provide classifications free of the subjective quality, meaning that the analysis is reproducible and stable when new objects are added. This has many applications in the fields of medicine or psychology, although different terms may be used there. For example, the term taxonomy is common in the categorisation of organisms in biology (Everitt et al., 2011).

The method of classification used in this study is one of the most common classification techniques, cluster analysis. The method of cluster analysis is used to reduce the number of observations and is based on the grouping of cases that are similar to one another. Cluster analysis organises data into meaningful groups or clusters, maximising the similarity of cases within a cluster while maximising the dissimilarity between clusters. The result is a

'partition' of the objects into groups, or clusters, one object belonging to one group only. Cases are assigned to groups they share characteristics with empirically, and the groups can then be labelled and described (Everitt et al., 2011). Cluster analysis is therefore appropriate for this study, as it produces a distinct set of groups which can be included in later regression models to represent a large number of areas.

While datasets can be divided in different ways by clustering, not all clusters solutions will be meaningful. Authors importantly point out that any classification should be judged by its usefulness, rather than optimal statistical fit (Everitt et al., 2011). The aim of this analysis is to provide a typology of areas which we consider a meaningful representation of reality based on theoretical knowledge. However, it should be recognised that while clusters of areas might have an intuitive interpretation, the resulting typologies are dependent on the variables chosen and the clustering method, with the number of clusters in some cases decided on by the researcher (Kendig, 1976).

As an alternative to cluster analysis, groups could be determined through latent class analysis (LCA). LCA is similar to factor analysis as it concerns the patterns of association among observations. It assumes there to be underlying latent variables, which cannot be measured and through which individual variables are related. Unlike factor analysis, LCA is suited for categorical responses and it estimates the conditional probabilities of a response belonging to one class (McCutcheon, 1987). Cluster analysis in turn uses different algorithms to find similarities between cases.

Compared to cluster analysis, latent class analysis has the advantage of assessment of model fit through likelihood statistics. While the aim of it is also to identify groups, LCA estimates alternatives for class memberships, which can be assessed through the likelihood statistics. However, cluster analysis is suited for continuous variables, hence being the preferred method for the current analysis. While the choice of the number of clusters is still subjective,

it relies more on theoretical understanding rather than likelihood statistics, as it should reflect the usefulness of the classification (McCutcheon, 1987).

### 5.1.4 **Entropy scores**

There are many other techniques to build measures of neighbourhood composition, and most prominent ones have come from the field of segregation research. Residential segregation refers to the degree to which different groups live apart from each other, and segregation measures are generally applied to the distribution of populations across whole cities. (Reardon & Firebaugh, 2002). Segregation measures provide information on neighbourhood mix on a single scale, as a difference to neighbourhood classifications, which are suited to the aim of this study to distinguish various types of neighbourhood.

Common measures of segregation or neighbourhood social mix are entropy scores, of which there are a few variations. For our purposes, scores measuring segregation between different categories are considered. A recommended entropy score is Theil's Entropy Index, denoted *E* (originally Theil, 1972, cited in Reardon & Firebaugh, 2002), which is a measure of evenness (Massey & Denton, 1988). This is calculated for one unit, i.e. neighbourhood, and is given by the following equation:

$$E = \sum_{m=1}^{M} \pi_m \, ln\left(\frac{1}{\pi_m}\right)$$

Here, *ln* is the natural logarithm, $\pi_m$ the proportion in group *m* in the neighbourhood, *M* indicating the number of groups (Reardon & Firebaugh, 2002). Higher scores represent high levels of mix. The minimum value of *E* is 0 and occurs when there is no diversity. The maximum level is given by the natural log of the number of groups used in the calculation and it occurs when individuals are evenly distributed across groups.

Derived from this but measuring the entropy score at the city level is Theil's *H*, also known as the information theory index (originally Theil, 1972, cited in e.g. Massey & Denton, 1988). It is a measure of evenness based on the deviance of each area from the entropy of the whole city. Being a multi-group measure, it therefore takes into account the total shares of groups. *H* can be interpreted as a measure of association between two variables that represent group and unit memberships. It is the weighted average deviation of each unit's entropy from the metropolitan-wide entropy, expressed as a fraction of the metropolitan area's total entropy. The index is aimed to measure segregation among unordered groups which is also found in our data. It has however been seen by some as difficult to interpret in research, as it is continuous (Massey & Denton, 1988; Reardon & Firebaugh, 2002). One form of this index based on the entropy index *E* is:

$$H = \sum_{j=1}^{J} \frac{t_j}{TE} \left(E - E_j\right)$$

Here *J* represents the total number of neighbourhoods, while *j* an individual neighbourhood, and *T* individuals. *E* is the whole city's entropy while *Ej* is one unit's entropy (Reardon & Firebaugh, 2002).

For the current analysis, the usefulness of entropy scores is recognised because they allow us to compare the level of mix across neighbourhood clusters. However, significant information would be lost when relying solely on them. A great advantage of cluster analysis for this study is that it provides a picture of the nature of mix by showing the proportions of groups in each cluster, therefore producing more descriptive measures (Bailey, 2011). Entropy scores do not allow us to distinguish how different groups are distributed in neighbourhoods as the values do not indicate the proportions of groups. A single score will obscure the group distributions within an area unit, as the same score can be produced with different combinations of groups. Nevertheless, as entropy scores are widely used and consolidated measures, they can be

calculated in the current analysis alongside clusters in order to compare the produced area classifications.

## 5.2 Methods of Cluster Analysis

This first part of this chapter justified the construction of neighbourhood measures in the research context and introduce the concept of area classification. It can be concluded that cluster analysis is our primary option to carry out the analysis of neighbourhood classification. This section will therefore discuss the different techniques and processes of cluster analysis.

The steps involved in the process of cluster analysis are well summarised by Milligan and Cooper (1987) and recognised by others (e.g. Mooi & Sarstedt, 2011). The complete process consists of the key steps summarised below, followed by more detailed explanation of each.

- First, the general clustering **algorithm** is chosen. The types of method to consider are hierarchical or partitioning methods, or a combination of these.
- The **number** of clusters to be retained needs to be decided on.
- Finally, and partly simultaneous with the previous step, the resulting clusters are **tested** and **interpreted**. Testing implies determining whether the clusters are significant or an arbitrary partition of the data.

### 5.2.1 Clustering algorithms

*Hierarchical clustering*

The two most commonly applied clustering algorithms are hierarchical and *k*-means clustering. Hierarchical clustering produces a series of partitions and not one classification. These are also known as stepwise or top-down methods. Hierarchical methods comprise a series of different computational algorithms that start from calculating the distances between objects. Based on these, groups are formed either through an agglomerative or divisive method. The

agglomerative method starts with all objects forming their own group, and continues by merging groups that are close together until the whole dataset is in one cluster. Agglomerative methods are more often used as divisive ones are more computationally demanding, however, neither agglomerative computations are quick on large datasets (Everitt et al., 2011; Manly, 2005).

The division method works from the opposite, all objects starting in the same group. The groups or clusters are then further split until each object is in their own group. The process is illustrated by a dendrogram, or a tree diagram, showing the merges or divisions at each stage of the analysis. It needs to further be decided what method for the linkage of the objects is used, as well as when to stop the splitting of the dataset to achieve the 'optimal' number of clusters (Everitt et al., 2011; Manly, 2005). The choice regarding the number of clusters will be discussed later.

*K-means clustering*

*K*-means cluster analysis is part of the group termed partitioning or optimisation methods. The method does not follow a hierarchical procedure in determining homogeneous clusters, but produces a single partition with distinct, non-overlapping clusters. Instead of distance measures, it aims to minimise within-cluster variation, starting by randomly assigning objects to clusters or assigning them to provided initial cluster centres ('seed points') and reassigning them in order to minimise this variation in an iterative process. The number of clusters will have been decided beforehand (Everitt et al., 2011; Manly, 2005).

The standard method of *k*-means uses Euclidean distances, which calculate the equivalent of shortest straight-line distance from each observation to the centre of the associated cluster. Each object then gets assigned to the cluster centroid with the shortest distance to it. This centroid is recomputed based on the mean values of the objects assigned to each cluster on the given variables.

This process is repeated until a stable solution is reached and there is no change in the cluster assignments (Manly, 2005).

Although only interval/ratio data should be used due to the use of Euclidean distances, this method is commonly applied on ordinal data despite distortions. The data should be continuous on the same scale, but we can standardise the data using for example the z-score method. In turn, *k*-means requires considerations about the number of clusters expected to arise. Variables should be checked for skewness and correlations, as high multicollinearity will make the clusters difficult to distinguish from one another. Further, outliers should be dealt with in advance as they are likely to affect cluster assignments (Tagg, 2011; Mooi & Sarstedt, 2011). The equation used by the *k*-means method is:

$$J = \sum_{j=1}^{k} \sum_{n \in S_j} \left( x_n - \mu_j \right)^2$$

The *k*-means equation aims to split the data into clusters by minimising the clustering criteria, therefore *J* is the total squared error. *K* is the number of clusters, *n* is the number of data points, $S_j$ is one partition and the data points within, $x_n$ is a data point from all cases and $\mu_j$ is the mean centroid value for $S_j$ (e.g., Green, 2013).

Previous studies have performed *k*-means clustering on social indicators using UK Census data (Bailey et al., 2012; Green, 2013; Livingston et al., 2013; 2014; Vickers et al., 2013). This method has some key advantages making it the suitable approach for this study. It performs quicker on large datasets ($n$>500) by making the initial partition into a specified number of clusters, and it is generally less affected by outliers. Importantly, this study hopes to obtain a distinct set of clusters informed by theory, which *k*-means allows us to produce.

### 5.2.2 Dissimilarity and distance measures

The step in the clustering process after choosing the algorithm (hierarchical or partitioning) is the method for measuring the proximity of objects. Measures of (dis)similarity concern the distance between pairs of objects (cases). This dissimilarity is not to be confused with dissimilarity as a measure of segregation. Similarity measures are based on proximity with a high value indicating closeness of objects. They determine the similarity between two individuals (or units) measured by the *k*th variable, with possible weights assigned to the variables. This measure is suitable for both continuous and categorical data within the same dataset (Everitt et al., 2011).

Dissimilarity measures in turn look at the distance between objects (low value means close together). These are more commonly used than similarity, with the choice of relevant measure made according to the type of data. The type of data used in this chapter is continuous (population counts), for which there are many possible, albeit similar measures (Milligan & Cooper, 1987; Everitt et al., 2011). We will use the most common measure, Euclidean distance:

$$d_{ij} = \left\{ \sum w_k \left( x_{ik} - x_{jk} \right)^2 \right\}^{\frac{1}{2}}$$

In the equation, $d_{ij}$ can be conceptualised as the 'straight-line' distance between objects *i* and *j*, $x_{ik}$ and $x_{jk}$ are the values for objects *i* and *j* on variable *k*, respectively, where there are *K* variables in the dataset. The weights $w_k$ are applied to the squared difference on each variable, and usually set to 1.0 if other weighting principles are not used (Milligan & Cooper, 1987).

The distance values are dependent on the particular scales of the variables, and therefore it is recommended that the data be standardised. A potential issue with Euclidean distance is the assumption that values are not correlated with one another, but this assumption might not be fulfilled in social science data. Alternatively, a measure called Mahalanobis distance, $D^2$ , can be used to take correlations into account. This has not been considered completely

satisfactory either, as it assumes that the variable dispersions are approximately the same in each group (Everitt et al., 2011).

Other measures include the city-block distance, which takes the shortest route between objects in a grid system like a car through city streets, therefore being a variation of the Euclidean distance. A different group of proximity measures are correlation-based measures, the most common being a modified Pearson's correlation coefficient computed between two objects. This eliminates the effects of differing means and variations between variables, in contrast to the Euclidean or city-block measures (Milligan & Cooper, 1987). However, the Pearson coefficient should be used only when variables are measured on the same scale, as otherwise means and variances are meaningless. The Pearson can falsely indicate correlation indices and consider two cases to be similar, as it only requires sets of scores to be linearly related to one another in order to find perfect correlation (Everitt et al., 2011). Therefore, Euclidean distances are deemed most suitable for our analysis.

*Between-cluster distances*

In addition to measuring the relationship between individual objects, between-cluster distances need to be calculated. This refers to the way distances from one cluster to another are determined (inter-group measures) (Everitt et al., 2011). Calculating the minimum distances between objects can be done through the single linkage algorithm and is also known as the *nearest neighbour distance*. Taking the distance of the closest members of clusters, this method can be rather simplifying of the 'total' cluster distance. In turn, the complete linkage method determines the maximum distances between groups as that between the most remote pair of individual cases, also known as *furthest-neighbour distance*. It should be noted that this latter method is therefore very much affected by outliers. A further measure is the *group-average clustering*, relying on the average of all between-individual measures when the individuals are in different clusters (Everitt et al., 2011).

In a further standard method, *centroid clustering*, clusters are represented by their mean values for each variable (the mean vector). Clusters with most similar mean vectors are merged and the inter-cluster distance is determined as the distance between centroids. A similar method is *median clustering*, which additionally weights the clusters equally so that a large cluster does not overtake a cluster with a smaller number of cases when they are merged. These methods require variables to be measured on an interval scale (Everitt et al., 2011; Manly, 2005).

Ward's distance method combines the "objects whose merger increases the overall within-cluster variance to the smallest possible degree" (Mooi & Sarstedt, 2011, p. 252). The merging of two clusters is based on the total sum of squares within clusters to minimise the total within-cluster error sum, and the method is also called the minimum variance method (Milligan & Cooper, 1987). A further advantage of the measure is that the centroids are weighted to adjust for difference between cluster sizes when computing centroid distances (Everitt et al., 2011). Ward's method tends to produce equally sized clusters, but can be distorted by outliers. The method is however commonly used and preferred for this analysis.

### 5.2.3 Choosing the number of clusters

Cluster analysis must also deal with the issue of deciding on a number of clusters as most methods require the number to be set by the user. It is especially important in *k*-means clustering where the number is set at the start of the procedure. Errors can then occur if a solution with too many clusters is produced as the clusters may be small and this increased number does not actually simplify the data, making interpretation confusing. Small clusters may reflect outliers, which impact on the variation and number of clusters. However, with too few clusters, the merging of clusters results in loss of detailed information (Milligan & Cooper, 1987).

There are some formal methods on how to decide on the number of clusters, for example, based on within-cluster or between-cluster variability. Hierarchical analysis produces graphs called dendrograms that show the merging process of clusters and can be used as an aid. However, there is no 'natural' definition of how the data should be partitioned, but the aim is to look for the optimal partition. The researcher must be able to justify the clusters with what are assumed to be the underlying social structures. Relying on mechanical criteria rather than theory implies a potential risk of 'overfitting' clusters (Everitt et al., 2011). In the current analysis, the determined number of clusters will be supported by graphs. However, as the analysis is theory-driven rather than data-driven, the choice is largely supported by theoretical assumptions.

### 5.2.4 **Reliability and statistical testing**

Different clustering methods may produce different classifications of the data. While a number of authors conclude that there is no optimal strategy to evaluate the results, many optimisation techniques have been suggested. The reliability or validation of the cluster results concerns each step of the analysis which all involve a chance of a specification error (e.g., Milligan & Cooper, 1987). Some of the stages were discussed previously, and this section will mainly consider the evaluation and interpretation of the results.

As the analysis is driven by data (variables are defined by the researcher), no pre-existing classification structure can be found (Milligan & Cooper, 1987). Therefore the clusters should to a large extent be judged by their usefulness. While the main aim is to construct useful classifications of the data, and the method includes largely subjective decisions, the resulting clusters should also be representative and accurate. The cluster structure should not be an artefact of the applied method. As Green (2013) mentions regarding his analysis on geographical areas, '[i]t is less about having each area correctly classified in its actual cluster, but that the relationships of the clusters overall fit a stable, applicable and useful structure' (p. 92). A problem occurs when cluster

memberships are not distinct and some objects remain on the edge of a cluster. Nevertheless, objects are placed in the cluster they are most similar to. It is important to remember that the clusters are based on the main patterns in the data, which remain despite this issue (ibid.).

Despite the criterion of usefulness, there are properties that have been suggested to ensure value of the result. Clusters can be described in terms of their internal cohesion and external isolation (Everitt et al., 2011). These criteria concern the distances between data points as well as between clusters. In the absence of a simple test statistic to check for the significance of the final cluster solution, the robustness of a classification can be assessed through statistical tests. Firstly, stability of the cluster solution can be evaluated by using different clustering procedures on the same data and testing whether these yield the same results. Where possible, the partitionings from different clustering methods, hierarchical and non-hierarchical, can be compared. Different dissimilarity or similarity measures can be used (Milligan & Cooper, 1987).

Another common approach is to split the dataset into two subsamples (for example, 80/20%) and to thereafter analyse the two subsets separately using the same parameter settings. This is also called a replication analysis. The first sample of the data is clustered and the centroids obtained. Then the objects from the second sample are assigned to the nearest centroid from the first sample. The second sample is then also clustered, and these results compared to those from the first cluster analysis. If the cluster centroids produced by the different solutions do not differ significantly, a high degree of stability can be assumed (Milligan & Cooper, 1987).

As to the interpretation of the clusters, the centroids should be examined by the average values they get for each variable. This allows us to see if the clusters can be distinguished from one another and in which aspects. There are two approaches to this: internal and external criterion analyses. Internal criteria refer to the goodness of fit between the dissimilarity matrix and the

resulting clustering, and different test statistics for this can be obtained. Further, the clusters can be subjected to hypothesis testing where the null hypothesis commonly states that the data do not manifest distinct clustering. This can be done by running an analysis of variance, ANOVA, to compare the cluster means. However, it can be noted that this procedure will often provide significant results even for random noise as the groups are not defined a priori. External criterion analysis in turn involves information that was not used in the clustering process. For example, variables which were not used to cluster the data can help to validate the solution, but these can be difficult to find as they would have been included in the original clustering (Milligan & Cooper, 1987).

## 5.3 Census data on tenure

The previous section detailed the process of cluster analysis and overviewed alternative measures of measuring mix. Cluster analysis was chosen as the preferred method for constructing a neighbourhood typology, as this allows us to observe the level of mix by producing the proportions of groups within each cluster, unlike single-score indicators. Entropy scores were identified as a means of measuring relative levels of mix between clusters. This section undertakes the analysis starting with a description of the variables.

### 5.3.1 Descriptive analysis

The cluster analysis is undertaken on three variables from the Census: the proportion of households in owner-occupation, private renting, and social renting, which are the largest tenure groups in Scotland and the UK. While studies in the past have tended to the focus on tenure mix mainly through measuring owner-occupation and social renting, the importance of private renting has increased in the housing market and has been included in more recent studies (Bailey, 2011; Livingston et al., 2013).

Table 5.2 provides a summary of the variables, what they consist of, and what the proportions are based on. Owner-occupied tenure consists of dwellings

owned outright and with mortgage. The second category is privately rented dwellings, and the third local authority or other social renting. Due to variation in the size of areas, we calculate proportions of each tenure in an area based on respective data zone/intermediate zone counts of households. The categories shared ownership and living rent-free or other rent are omitted due to low area counts.

Table 5.3 summarises the mean percentages, standard deviations, and skewness and kurtosis statistics for the tenure categories at both area levels and Census years. For cluster analysis, it is generally hoped that the distributions of variables will not be very skewed or kurtotic. However, private renting has higher values of skewness and kurtosis. We do not omit areas with more extreme values as excluding data would limit the classification that aims to look at the whole geographical pattern of the three tenure types.

Table 5.2 Variables for cluster analysis and the categories they consist of. Source: Scotland's Census 2001 and 2011.

| **Variable in analysis** | **Consists of** | **Proportion based on** |
|---|---|---|
| Owner-occupation | Owned outright + Owned with a mortgage or loan | All households (excluding Rent: other and Rent-free) |
| Private rent | Rented: Private landlord or letting agency | |
| Social rent | Council (Local authority) + Other social rented | |

Table 5.3 Summary statistics for three tenure types in data zones and intermediate zones. Source: Scotland's Census 2001 and 2011.

| Area level/year | Variable | Mean | Std. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|---|
| DZ 2001 | Owner-occupation | 65% | 0.21 | -0.51 | 2.56 |
| | Private rent | 11% | 0.11 | 2.37 | 9.46 |
| | Social rent | 24% | 0.21 | 0.89 | 3.24 |
| DZ 2011 | Owner-occupation | 65% | 0.22 | -0.53 | 2.54 |
| | Private rent | 11% | 0.11 | 2.39 | 9.56 |
| | Social rent | 24% | 0.21 | 0.93 | 3.27 |
| IZ 2001 | Owner-occupation | 65% | 0.17 | -0.53 | 2.87 |
| | Private rent | 11% | 0.08 | 2.48 | 9.94 |
| | Social rent | 24% | 0.17 | 0.78 | 3.35 |
| IZ 2011 | Owner-occupation | 65% | 0.18 | -0.54 | 2.85 |
| | Private rent | 11% | 0.09 | 2.39 | 9.10 |
| | Social rent | 24% | 0.17 | 0.81 | 3.41 |

To further examine the distribution of the tenure categories in relation to one another, a triplot (Fig. 5.1) is produced showing the position of each data zone in regard to the proportions of owner-occupation, private and social renting. The plot is a concise way of examining the clustering of areas along the three tenure axes, and allows us to gauge whether there is any polarisation between two categories, which could imply that one or more variables could be omitted from the analyses.

There is a large cluster of data zones at the top of the plot that have high proportions of owners, and very low proportions of private rent (Fig. 5.1). This is expected, as Scotland has a large number of rural areas which are particularly owner-dominated. However, there is a spread of data zones in the middle indicating a high level of mix with variation in regard to the proportions of each tenure. It can be concluded that including all three categories benefits the analysis and allows us to take into account the variation in tenure mix.

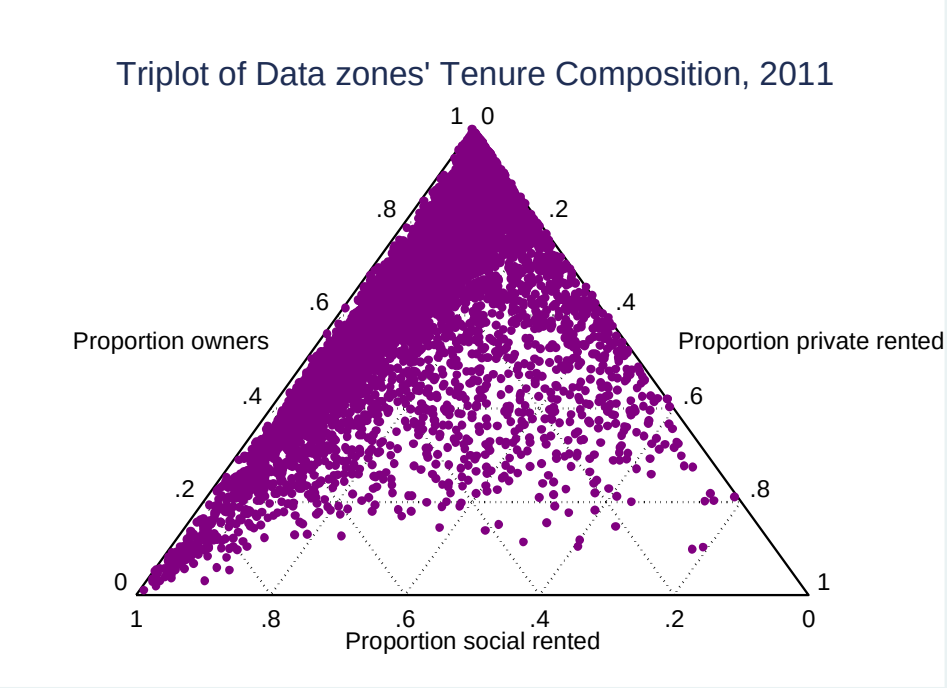


Figure 5.1 Triplot of correlations of tenure types. Source: Census 2011.

## 5.4 Cluster analysis

This section presents the cluster solutions for data zones and intermediate zones at two time points, 2001 and 2011. The process of *k*-means clustering as the appropriate clustering technique is explained. Along with cluster analysis, entropy scores are provided for each cluster to further compare levels of mix within the cluster solutions. As the cluster solutions are nearly identical at 2001 and 2011 for each area level respectively, the steps taken in statistical testing of the solutions relate to both and are exemplified through the data zone clusters for 2011 as the latest data. Finally, the cluster solutions are described through other area and housing characteristics in order to provide a picture of the composition of areas within each cluster.

### 5.4.1 Data zone clusters

First, cluster analysis of tenure is undertaken on data zones at both Census years. The *k*-means algorithm was run on Stata using Euclidean distance for intra-cluster proximity and Ward's linkage method to define inter-cluster

distances. The resulting cluster solution is nearly identical at both time periods and therefore the description of the cluster compositions relates to both. Figures 5.2 and 5.3 present the final five-cluster solutions from the 2001 and 2011 data, respectively, with details in Tables 5.4 and 5.5. The names of the clusters are abbreviated using the largest tenure first, followed by the second largest tenure of 20% or more.

The *k*-means algorithm was run initially by setting the number of clusters to be produced to three, four, and five clusters. The five-cluster solution is considered the most appropriate to represent variation in data zones' tenure mix, as solutions with more clusters do not appear to identify particularly distinct types. With this solution, there is slightly more distinction between clusters compared to three or four-cluster solutions. In particular, a cluster consisting of 45% owners and 40% private rent (OO-PR) appears. The size of clusters should also be considered in deciding on the final solution so that enough information is retained but no cluster is so small that it reflects outliers. The clusters OO-PR and SOC-OO are noticeably smaller than the others, but still comprise a significant amount of data zones, and a five-cluster solution provides more information with the addition of the OO-PR cluster (Tables 5.4 and 5.5). In solutions with six or more clusters, no further distinct groups arise, but the clusters comprised of owners mixed with social rent (OO-SOC 1 and 2) start to separate into further clusters.

Tables 5.4 and 5.5 present the means of the tenure categories in each of the five clusters. The names of the clusters mention first the majority group (if one) and the next largest group over 20%. Owner-occupiers comprise the largest proportion in all the clusters, except SOC-OO, which is to be expected as owner-occupiers represent two-thirds of all households.

Table 5.4 Description of data zone tenure clusters 2001.Source: Census 2001.

| **Data zone clusters 2001** | **Label** | **Owner** | **Private rent** | **Social rent** | **Mean entropy** | **N** |
|---|---|---|---|---|---|---|
| Majority owner | OO | 88% | 7% | 5% | 0.37 | 2066 |
| Majority owner mixed with social | OO-SOC 1 | 70% | 10% | 20% | 0.70 | 1808 |
| Owner mixed with social 2 | OO-SOC 2 | 51% | 8% | 41% | 0.81 | 1497 |
| Owner mixed with private | OO-PR | 45% | 40% | 15% | 0.85 | 460 |
| Majority social mixed with owner | SOC-OO | 26% | 8% | 67% | 0.70 | 669 |
| **Mean of all data zones** | | 65% | 11% | 24% | 0.63 | 6500 |

The largest cluster by population is the majority owner (OO) cluster, reflecting the large proportion of owner-occupiers in Scotland and their concentration into specific areas. Areas in this cluster tend to have the lowest amount of tenure mix with the proportion of owners being 88% on average (Tables 5.4 and 5.5).

The next two clusters consist of owners as the largest group with noticeable shares of social renters (OO-SOC 1 and OO-SOC 2). Therefore, together with the OO cluster, these clusters are referred to as owner-dominated. The clusters were separated due to the 21 percentage point average difference in the proportion of social rent in the two clusters, which makes the cluster OO-SOC 2 more mixed (Tables 5.4 and 5.5). The separation was considered to provide variation which may potentially lead to differences in outcomes later.

Table 5.5 Description of data zone clusters 2011.Source: Census 2011.

| Data zone clusters 2011 | Label | Owner | Private rent | Social rent | Mean entropy | N |
|---|---|---|---|---|---|---|
| Majority owner | OO | 88% | 7% | 5% | 0.37 | 2394 |
| Majority owner mixed with social | OO-SOC 1 | 69% | 10% | 21% | 0.71 | 1893 |
| Owner mixed with social 2 | OO-SOC 2 | 50% | 8% | 42% | 0.81 | 1496 |
| Owner mixed with private | OO-PR | 45% | 40% | 14% | 0.84 | 534 |
| Majority social mixed with owner | SOC-OO | 25% | 7% | 68% | 0.68 | 666 |
| **Mean of all data zones** | | 65% | 11% | 24% | 0.69 | 6976 |

The cluster OO-PR appears to be the most evenly mixed across all three tenures, as it has the most even distribution of tenure types with 45% owners, 40% private renting, and 15% social renting (Table 5.4). This cluster is therefore referred to as the most (evenly) mixed area type. We expect data zones in this cluster to be mainly located in inner cities that have high levels of private renting.

The final cluster SOC-OO consists on average of over 60% social rent, over 20% owners, and around 8% private rent (Tables 5.4 and 5.5). The high percentage of social rent implies that this cluster captures large concentrations of social housing, many of which are located within urban areas.

*Entropy scores*

Tables 5.4 and 5.5 include the average data zone entropy scores for each cluster (see section 5.4 for details of how these are calculated). The range of scores of the *E* index depends on the number of variables included, and to make the scores comparable across cluster analyses we have standardised them by dividing with the maximum score (log of number of groups, so *log*(3)=1.10). Higher scores indicate that the area has close to even proportions of each

tenure, or high mix, while lower scores indicate low mix with one tenure dominating.

The entropy scores confirm that the cluster OO-PR has the highest level of mix, with the mean *E*=0.85 and 0.84, confirming this as the most mixed cluster. The cluster with the next highest average entropy score is OO-SOC 2, with large proportions of owners and social renting (2001 and 2011 mean *E*=0.81). The cluster with the lowest average entropy score, *E*=0.37, has the highest mean of owner-occupiers (88%, both years) therefore being the least mixed cluster.

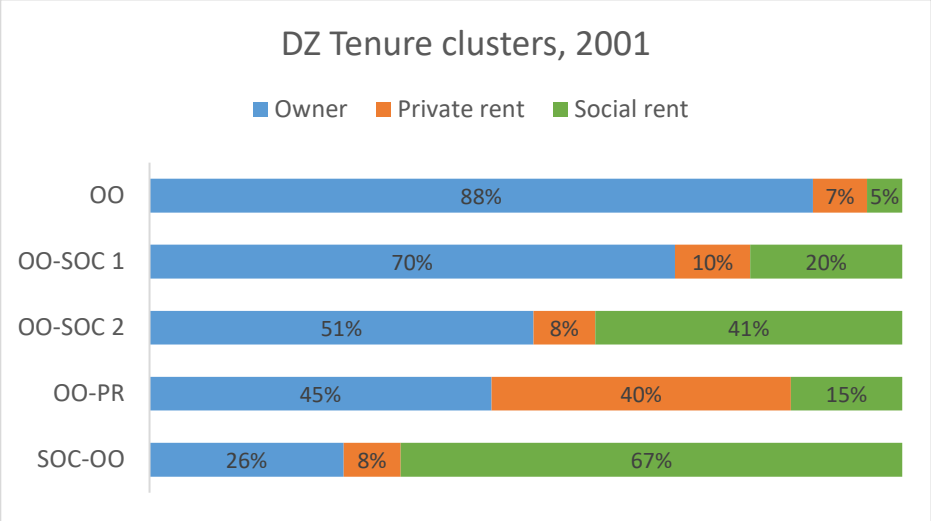


Figure 5.2 Tenure clusters for data zones 2001. Source: Census 2001.

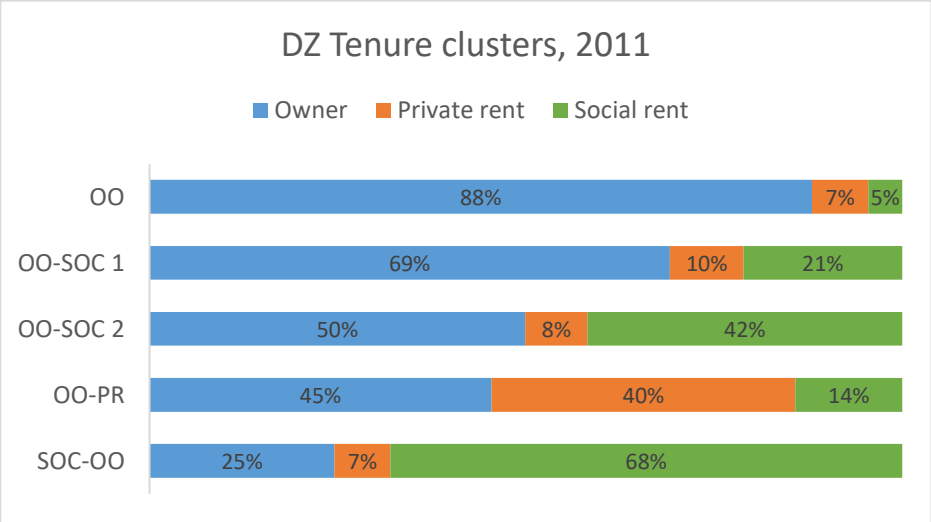


Figure 5.3 Tenure clusters for data zones 2011. Source: Census 2011.

*Distribution of data zones in clusters*

The *k*-means method allocates data zones into clusters based on their closeness to the mean values of each tenure type it has found. While the analysis provides the mean proportions of tenure types in each cluster, this means that there are data zones with values farther away from the means. The triplot figure (Fig. 5.4) of all data zone cluster allocations shows the grouping of data zones in the OO cluster at the high end of the owner axis, with low proportions of private renting. At the other end of the axis are data zones in the SOC-OO cluster with the highest proportions of social renting, and moderate proportions of owners in some data zones. Meanwhile, data zones in the OO-PR cluster have the largest spread of tenure types, with moderate to high proportions of private renting as well as owners, and low to moderate proportions of social renting. The plotting of data zones further confirms that the cluster solution does not only replicate the proportions of the original variables and provides useful information for the analysis.

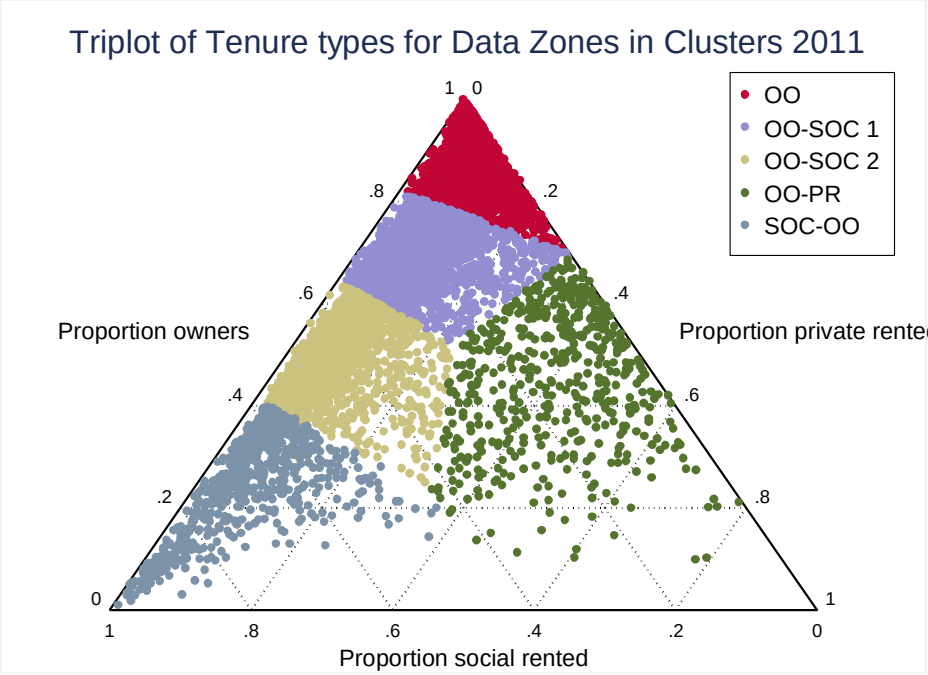


Figure 5.4 Triplot of data zones assigned to clusters. Source: Census 2011.

*Reliability and significance testing*

As discussed in the section on reliability, there is a need to test the cluster solution in order to determine its robustness. A so-called replication analysis (Milligan & Cooper, 1987) was run by taking a subsample of 80 % of the data and running the *k*-means algorithm with five clusters on it. Further solutions with a different number of clusters were ran as with the original data. This showed that the cluster means stayed very close to the original cluster means, which confirms that the chosen five-cluster solution is reliable across the data.

Interpreting clusters further involves examining the cluster centroids, which are the means of the clustering variables in one cluster. Standard deviations of the tenure variables (omitted here) in each cluster remain under 0.1 in the final solution, indicating that the cases are relatively close to the cluster means. The exception is cluster OO-PR where all standard deviations are just above 0.1, implying there is slightly more deviation from the means. In figure 5.4 above, we can see visually that this cluster is a little more dispersed.

We can test whether the solution has found significantly different cluster means though significance tests (independent t-tests or ANOVA). Some say that this is an important step in the process as only when they exhibit different means can the clusters be distinguished (Mooi & Sarstedt, 2011). The ANOVA on our final cluster solution provides highly significant *F*-statistics.

Furthermore, a distance matrix for the five-cluster *k*-means solution can be obtained to examine between-cluster distances. Table 5.6 includes the Euclidean distances for the final data zone cluster solution with the highest and lowest distance values highlighted. Exemplified for the 2011 data zone clusters, the table shows that the lowest distance values are between clusters OO-SOC 1 and SOC-OO, as well as OO-SOC 1 and OO-PR, meaning their cluster centres are nearer to one another. Meanwhile, SOC-OO and OO have the largest distance, which could be expected as they have almost opposite proportions of owners and social renters.

Table 5.6 Distance matrix for the final cluster solution, data zones 2011. Source: Census 2011.

| Cluster | OO | OO-SOC 1 | OO-SOC 2 | OO-PR | SOC-OO |
|---|---|---|---|---|---|
| OO | 0 | | | | |
| OO-SOC 1 | 0.64 | 0 | | | |
| OO-SOC 2 | 0.66 | 0.39 | 0 | | |
| OO-PR | 0.36 | 0.28 | 0.42 | 0 | |
| SOC-OO | 0.89 | 0.25 | 0.54 | 0.53 | 0 |

To further check for consistency in the cluster solution, the *k*-means analysis was run using different distance measures. The most common ones which are available in Stata are squared Euclidean (the sum of the squared distances) and absolute value distance measures (the city-block distance, sum of the variables' absolute distances). These produced very similar three, four, and five-cluster solutions compared with the initial Ward method, and are not presented in detail. Further, the solution was tested by providing the *k*-means algorithm with the parting seed instead of allowing it to assign starting cluster centres at random, but this did not change the resulting cluster solution.

### 5.4.2 **Intermediate zone clusters**

The same *k*-means clustering procedure is undertaken on the proportions of the tenure types in intermediate zones. Intermediate zones are aggregations of data zones within local authorities and are designed to contain between 2,500 and 6,000 people, meaning there are fewer of them (around 1250).

A four-cluster solution with intermediate zones is considered best after testing for solutions with three to six clusters. It was expected that the solution for intermediate zones would result in a lower number of clusters compared to data zones due to the larger geography which tends to reduce differences between areas. A four-cluster solution is considered to provide a sufficient amount of variation between the clusters. Tables 5.7 and 5.8 present the final

cluster solutions for 2001 and 2011, respectively. The solution is again virtually identical at both time periods. The analysis on intermediate zone provides clusters that appear somewhat more mixed compared to the data zone solution, indicated by higher average entropy scores, which reflects the larger size of intermediate areas. This further makes the average tenure distributions slightly less distinct between clusters. Figures 5.5 and 5.6 summarise the cluster solutions for both Census years.

The intermediate zone analysis provides clusters with comparable tenure distributions to the data zone solution. The first cluster is the majority owner cluster (OO) and has the lowest mix as indicated by the average entropy score of 0.55. As a difference to the data zone solution, only one cluster with a majority of owners and social rent as second largest group (OO-SOC) is retained, as this did not separate into distinct clusters in further solutions. The third cluster, OO-PR, has the highest proportion of private renters and appears the most evenly mixed across tenure types, also having the highest average entropy score (mean $E$=0.91). The final cluster is comprised of a majority of social renters with owners as the second group (SOC-OO) (Table 5.7).

Table 5.7 Description of the intermediate zone clusters 2001. Source: Census 2001.

| **Intermediate zone clusters 2001** | **Label** | **Owner** | **Private rent** | **Social rent** | **Mean Entropy** | **N** |
|---|---|---|---|---|---|---|
| Majority owner | OO | 80% | 9% | 11% | 0.55 | 560 |
| Majority owner mixed with social rent | OO-SOC | 61% | 9% | 31% | 0.78 | 430 |
| Owner mixed with private | OO-PR | 41% | 38% | 20% | 0.91 | 66 |
| Majority social rent mixed with owner | SOC-OO | 38% | 9% | 53% | 0.80 | 179 |
| **Mean of all IZs** | | 65% | 11% | 24% | 0.69 | 1235 |

Table 5.8 Description of the intermediate zone clusters 2011. Source: Census 2011.

| **Intermediate zone clusters 2011** | **Label** | **Owner** | **Private rent** | **Social rent** | **Mean Entropy** | **N** |
|---|---|---|---|---|---|---|
| Majority owner | OO | 80% | 9% | 11% | 0.55 | 578 |
| Majority owner mixed with social rent | OO-SOC | 61% | 9% | 31% | 0.80 | 439 |
| Owner mixed with private | OO-PR | 42% | 38% | 20% | 0.91 | 81 |
| Majority social rent mixed with owner | SOC-OO | 38% | 9% | 53% | 0.80 | 181 |
| **Mean of all IZs** | | 65% | 11% | 24% | 0.69 | 1279 |

The clusters discovered by this solution are similar to those found by Livingston et al. (2013) for Lower Super Output Areas in England, which correspond to small intermediate zones[10] (having maximum populations of 3000). This confirms that the cluster solution is a good representation of the tenure composition of intermediate areas. Furthermore, statistical testing procedures were carried out on the intermediate cluster solution, and with similar conclusions to those made in regard to the data zone solution, the final intermediate zone clustering is considered to hold.

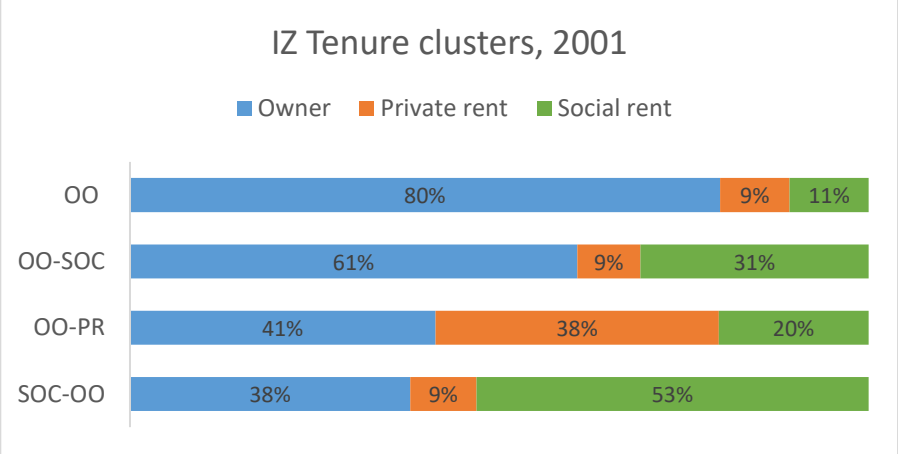


Figure 5.5 Tenure clusters for intermediate zones 2001. Source: Census 2001.

[10] https://www.nrscotland.gov.uk/files/geography/2011-census/geography-bckground-info-comparison-of-thresholds.pdf [Accessed 29/04/2019]

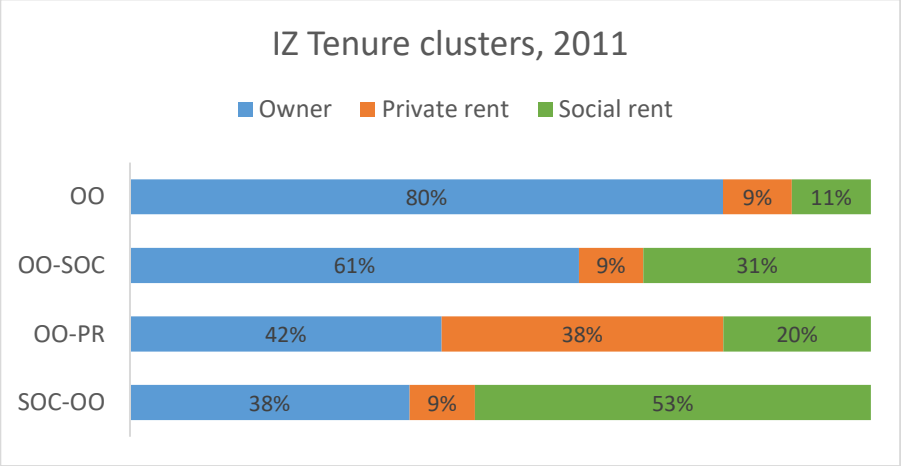


Figure 5.6 Tenure clusters for intermediate zones 2011. Source: Census 2011.

### 5.4.3 **Descriptive analysis of clusters**

The analysis resulted in a five-cluster solution for data zones and four clusters for intermediate zones. This section provides descriptive analysis of the cluster compositions, which will aid in the interpretation of the results with regard to the local service outcomes in later analyses. The description is provided for the 2011 data zone clusters, as there were negligible differences in the composition of clusters between the years, while the intermediate zones will reflect the data zone clusters.

*Urban/rural categories*

First, we examine the spatial distribution of the clusters and particularly the allocation of urban and rural areas, as this will lead to variations in the availability and access to services. Figure 12 presents the shares of data zones in each cluster by the 6-fold urban/rural classification of areas by the Scottish Government[11]. The classification used is the 2011-2012 update coinciding with the 2011 Census.

The figure shows a difference between the first three owner-dominated clusters and the two more mixed clusters. The owner-dominated clusters are

[11] Source: http://www.gov.scot/Topics/Statistics/About/Methodology/UrbanRuralClassification [Accessed 19/04/2019]

more spread across the area types, while large majorities of data zones in the OO-PR and SOC-OO clusters are located within urban areas (around 90% of each).

Mapping the clusters onto data zones (Appendix A1) further confirms the urban/rural pattern. Rural areas are largely dominated by the first two owner-majority clusters, while more variation in data zone assignments is found near cities. Glasgow especially has a large number of social rent-dominated data zones (SOC-OO) which overall are the most concentrated in urban areas, as shown in Figure 5.7. Cities also have concentrations of data zones in the owner-private rent (OO-PR) cluster, while large OO-PR areas stand out in accessible rural areas (possibly consisting of large data zones due to their lower population counts). In summary, the cluster solution reflects urban/rural categories to an extent, which implies that the area type should be controlled for in the analyses of local service outcomes. However, as the cluster allocations do not perfectly follow the urban/rural categories, the clustering of tenure shows more variation in the housing composition of small areas providing a useful measure for the analysis.

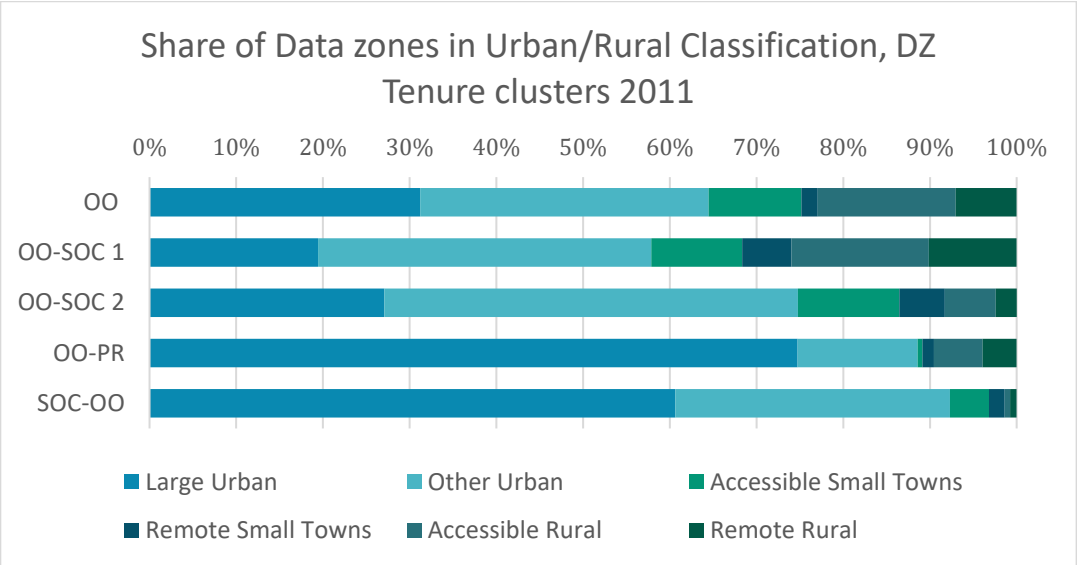


Figure 5.7 Data zone tenure clusters by urban-rural classification. Source: Census 2011.

*Deprivation*

Secondly, the cluster solution is examined alongside deprivation scores. We compare the Scottish Index of Multiple Deprivation, SIMD, in each cluster. The overall SIMD combines seven dimensions (income, employment, health, education, housing, crime, geographical access)[12] into a single indicator using aggregate statistics from data zones. The following figure plots the SIMD rank, which orders data zones from the most deprived (ranked 1) to the least deprived (ranked 6976) (Fig. 5. 8). The measure is based on the latest SIMD figures from 2016 as they are estimated using the 2011 data zone identifiers, making them a more appropriate match with the current Census area data.

In the box plot (Fig. 5.8), the line within the box indicates the median i.e., 50% of observations are within the box, the box captures the inter-quartile range and the ends of the whiskers indicate the lower and upper adjacent (non-outlier) values. The clusters with higher proportions of social renting, the OO-SOC 2 and SOC-OO clusters, have lower average deprivation rankings, implying more deprivation. This is expected as areas dominated by social rent tend to have higher levels of deprivation (e.g., Kearns & Mason, 2007). In turn, the majority owner cluster (OO) has on average the least deprived data zones. The largest range of scores is found in the OO-PR cluster, which may be expected due to variation in the quality and price of private renting. Comparing the two most mixed clusters, OO-PR has higher average rankings than OO-SOC 2, coinciding with its lower percentage of social rent (14% compared to 42 % in OO-SOC 2).

[12] Scottish Government (2016): SIMD 16 Technical Notes. Available at: www.gov.scot/simd [Accessed 14/08/19]

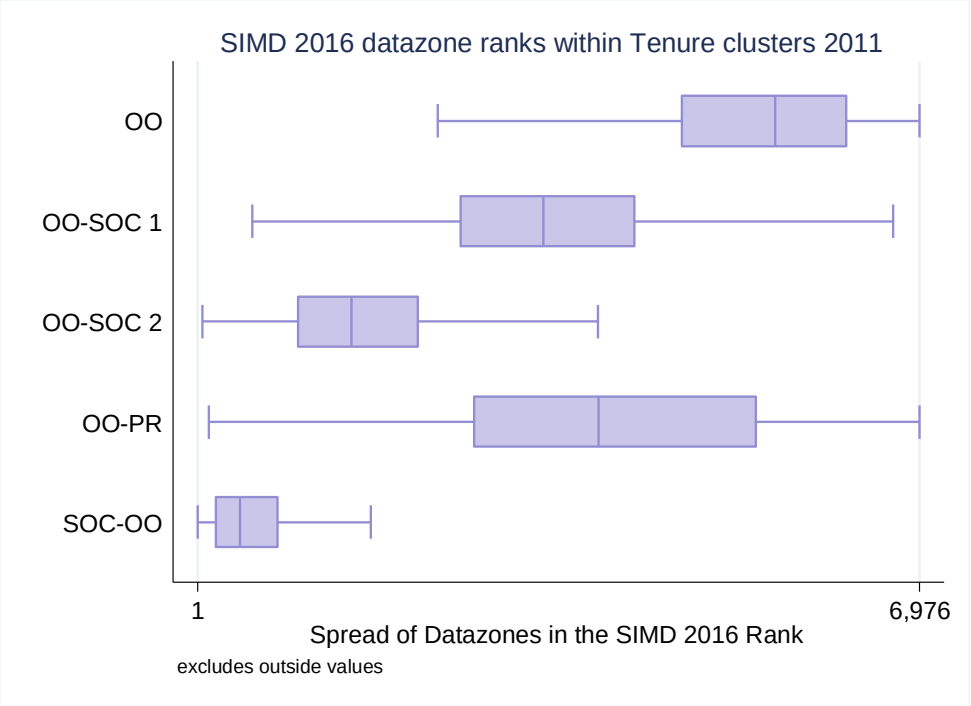


Figure 5.8 Spread of data zones in SIMD 2016 rank by tenure clusters. Source: Census 2011.

Together with the urban/rural categories, this description implies a difference between the owner-dominated tenure clusters and the two remaining clusters. The clusters OO and OO-SOC 1 comprise more data zones in small towns and rural areas, whereas the OO-PR and SOC-OO data zones are largely urban. Meanwhile, the cluster OO-SOC 2 can be said to remain in-between the first and the last two clusters in terms of urbanity having a more even range of area types. As for deprivation, the clusters with more social housing, OO-SOC 2 and SOC-OO, comprise more data zones in the low end of the deprivation rank.

## 5.5 Summary

This Chapter constructed a measure of neighbourhood tenure mix for the purpose of later analyses. The analysis resulted in a neighbourhood typology indicating areas with different levels of mix, which was achieved through cluster analysis. The first section described the aim of the analysis and justified the construction of bespoke measures in relation to the research context. Cluster analysis was decided on as it provided a more descriptive measure of mix through a distinct area typology. In addition, entropy scores were presented as an alternative method of capturing the neighbourhood context. A classification method was however preferred as it allows us to observe distributions of groups compared to a single scale indicator. The procedure of cluster analysis and relevant optimisation measures were explained, concluding that *k*-means clustering was the appropriate method for the current analysis.

The cluster analysis was undertaken on household tenure data from Scotland's Census 2001 and 2011 in order to link the clusters to corresponding years of the Scottish Household Survey. The cluster solutions were nearly identical at both time points. The data linkage to local service outcomes also prompted us to produce the clusters using two area levels: data zones and intermediate zones. As data zones will be the primary scale of analysis, the process relating to them was explained in more detail. A five-cluster solution for data zones and a four-cluster solution for intermediate zones was retained. Entropy scores were also calculated for each cluster. While the entropy scores point to relatively high levels of mix in all clusters (with the exception of one), descriptive tables from cluster analysis allow us to observe the distribution of tenure groups within each cluster.

It was acknowledged that cluster analysis as a method of classification entails some subjectivity in regards to choosing variables and the 'right' amount of clusters. To minimise this, some validation methods were carried out and the final cluster solutions held. However, as it was discussed, the choice of the

final cluster solutions was primarily based on the theoretical underpinnings and usefulness of the clusters. The final choice of clusters further relates to the balance between distinctiveness (clusters are not too similar) and size (not too small). For data zones, a five-cluster solution, and for intermediate zones, a four-cluster solution was decided on and will be carried onto further modelling.

# 6 Individual-level analysis of local services

This Chapter begins the analysis of local service outcomes in the Scottish Household Survey (SHS). As summarised in the methods chapter (Chapter 4), the dataset covers three categories of outcomes concerning local services (Frequency of Use, Convenience and Satisfaction), which fit the research objectives that concern perceptions of access to and quality of services at the neighbourhood level. Before focusing on area-level variations in the following Chapters, this Chapter undertakes a simple regression analysis allowing us to establish the relative importance of household and individual variables in predicting perceptions of local services.

As described in Chapter 4, the service outcomes comprise subjective questions on local services. Subjective measures of residents' experience are an important aspect when gauging how possible neighbourhood characteristics such as tenure mix might relate to levels of service provision. The outcomes concern the convenience and satisfaction with local services, which can be considered perceptions of access to and quality of services. A related outcome is the self-reported frequency of use of services. This will provide an indication of use and possible patterns among user groups, which will likely be reflected in the perceptual questions.

The structure of this chapter consists of descriptive analysis and the construction of the composite outcome indicators, followed by regression models for these composite indicators. Section 6.1 describes the predictor variables, which consist of demographic and socio-economic characteristics of respondents. After this, descriptive analysis of the outcomes for individual services is undertaken in section 6.1.2, covering services across all three outcome categories. Section 6.1.3 provides a summary of how the key composite outcome indicators used in the subsequent area-level analyses are formed. Lastly, section 6.2 describes the simple regression models for each of the composite outcome indicators.

## 6.1 Descriptive analysis

### 6.1.1 Predictor variables

This analysis examines the extent to which individual and household factors can predict local service outcomes. The predictor variables consist of demographic, socio-economic, and housing characteristics which are thought to contribute to different perceptions of services: age, gender, household type, the National Statistics Socio-economic Classification of occupations (NSSeC), income, tenure, and length of residence (Table 6.1). It is considered important to include both the NSSeC and income groups despite them both indicating socio-economic status, as income levels will not directly co-vary with occupation. In addition, households' financial resources will be reflected to an extent in their employment status and tenure, and therefore income is controlled for. Table 6.1 presents the frequencies of the household and individual variables in both periods covered by the SHS. As explained in the methods Chapter, survey weights created by the SHS team for individual response data are applied here and throughout. There are around 109,000 individuals covered by the survey across the two time periods.

The demographic and household factors are expected to contribute to the Frequency of Use of Services, so that younger people, families with children, and those with higher incomes are more frequent users. Frequency of Use is perhaps the most likely of the outcomes to also vary across different services. As to Satisfaction and Convenience, we expect that older age groups and retired people are more likely to indicate more positive perceptions of services as being more settled in their neighbourhood and possibly having lower expectations for services. Income and socio-economic status can also explain satisfaction through the choices they permit individuals to have. In turn, groups with limitations regarding mobility – such as older individuals and those with disabilities are likely to experience many services as inconvenient.

Attention is also paid to differences among tenure groups, as these will contribute to the success of tenure mix. Previous research on mixed areas has found social renters to have lower levels of use and satisfaction with local amenities compared to owners (e.g., Atkinson & Kintrea, 2001; Bond et al., 2011; Clark & Kearns, 2017). While perceptions of specific services may vary, it has been suggested that social renters' greater dependency on some services such as public transport can lead to lower levels of satisfaction (ibid.). As suggested in the literature review (Chapter 3), social renters may experience multiple disadvantages in regard to local provision, as many areas dominated by social renting are classified as resource-deprived. In turn, home-owners' resources imply more mobility and freedom of choice regarding services, which may be reflected in higher expectations and lower levels of satisfaction with locally provided services (e.g., Duffy, 2000). As for Convenience of Essential Services, location is likely to be a strong factor in perceptions of access, which may reflect onto the patterns for tenure, as suburban and rural areas with poorer access to services host higher shares of owner-occupiers and renting is more prominent in cities.

The composition of the sample is very similar in the two periods (Table 6.1). Age, sex and household type profiles are quite similar. There are slightly more people renting privately and slightly fewer in social renting, reflecting changes in housing tenure over this period. The largest change is in the income bandings where the use of fixed categories combined with inflation means more people in the highest income band in the more recent period.

Table 6.1 Distribution of household predictor variables.SHS 1999-2002, 2009-2011.

| Variable | Category | SHS 1999-2002 | | SHS 2009-2011 | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| Age | <=25 | 2,585 | 9 | 2,661 | 6 |
| | 25-35 | 5,036 | 18 | 6,066 | 13 |
| | 36-45 | 4,960 | 18 | 8,343 | 18 |
| | 46-55 | 4,331 | 16 | 8,548 | 19 |
| | 56-65 | 4,148 | 15 | 7,960 | 18 |
| | 65+ | 6,885 | 25 | 11,591 | 26 |
| Gender | Female | 11,956 | 43 | 19,094 | 42 |
| | Male | 15,991 | 57 | 26,075 | 58 |
| Household type | Single adult | 4,278 | 14 | 7,762 | 17 |
| | Small/large adult | 8,193 | 27 | 12,195 | 27 |
| | With children | 8,366 | 28 | 11,164 | 25 |
| | Pensioners | 8,976 | 30 | 14,048 | 31 |
| NSSeC | Employers and managers | 4,352 | 8 | 1,945 | 6 |
| | Professional/Intermediate | 7,306 | 14 | 4,560 | 13 |
| | Service/Supervisors | 10,753 | 20 | 5,601 | 16 |
| | Manual workers/routine | 8,057 | 15 | 4,213 | 12 |
| | Looking after home | 4,008 | 8 | 1,967 | 6 |
| | Retired | 14,868 | 28 | 12,493 | 37 |
| | Jobseeker | 1,017 | 2 | 1,170 | 3 |
| | Disabled | 2,873 | 5 | 2,250 | 7 |
| Income | £0-6000 | 4,039 | 14 | 2,172 | 5 |
| | £6000-10 000 | 6,658 | 23 | 5,598 | 13 |
| | £10 000-15 000 | 6,229 | 21 | 8,506 | 20 |
| | £15 000-20 000 | 4,503 | 15 | 6,574 | 15 |
| | £20000+ | 7,742 | 27 | 20,603 | 47 |
| Tenure | Owner | 38,560 | 65 | 29,955 | 67 |
| | Private rent | 3,359 | 6 | 4,485 | 10 |
| | Social rent | 17,150 | 29 | 9,981 | 22 |
| Length of residence | <1 year | 2,395 | 9 | 3,248 | 8 |
| | <=10 years | 13,169 | 47 | 17,769 | 44 |
| | 11+ years | 12,382 | 44 | 18,932 | 47 |
| Total N | | 60,850 | | 48,094 | |

### 6.1.2 Local service outcomes

*Frequency of Use of Services*

The first set of outcomes in the SHS data for local services is Frequency of Use. Different services are likely to vary in the frequency with which they are accessed, as they correspond to different needs and preferences. It is important to first examine patterns in service use according to the predictor variables, as these patterns are likely to be further reflected in the perceptions of Convenience and Satisfaction.

The 1999-2002 survey asks about the Frequency of Use of the following services: libraries, parks, museums, swimming, and sports (Fig 6.1). The 2009-2011 data comprises the same services with the exception of swimming, and includes two additional services: theatres/concert halls, and community centres (Fig. 6.2).

In addition, the 2009-2011 data contains a second group of services with slightly different response categories. This group consists of services that is named Necessities: post offices, banks, cash machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, and public transport (Fig 6.3).

The response categories are somewhat different in the early and later data, but the responses are collapsed into consistent categories for the regression models. Figures 6.1 through 6.3 present the distribution of responses for each group of services. Overall, large proportions of respondents report using most of the services less than once a year. In 1999-2002, parks have the highest proportion of use ‘yesterday’ or ’within the last week’ (34%), while museums the lowest (6%). The pattern is similar in 2009-2011. Out of the necessities in 2009-2011, food shops and public transport have the highest proportions of respondents using them ‘more than once a week’ (50% and 25%, respectively).

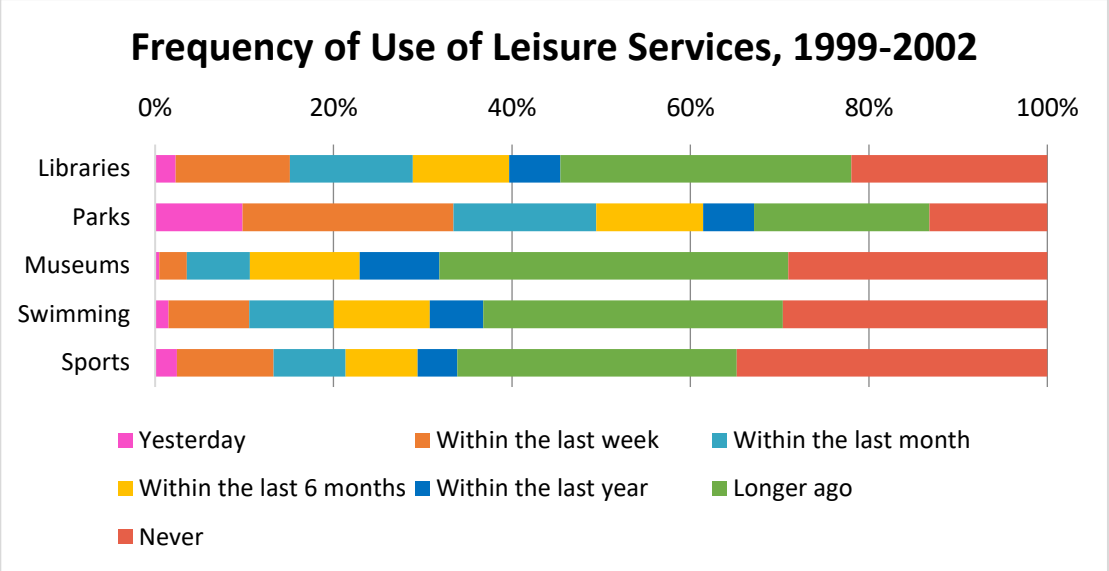


Figure 6.1 Distributions of responses to Frequency of Use of Leisure Services, 99-02. SHS 1999-2002

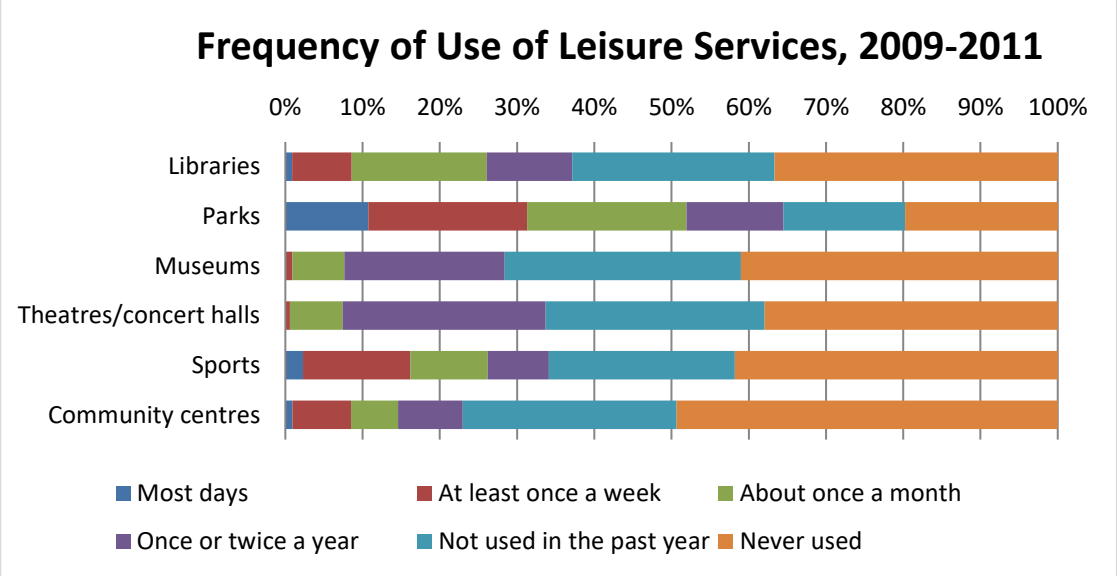


Figure 6.2 Distributions of responses to Frequency of Use of Leisure Services, 09-11. SHS 2009-2011.

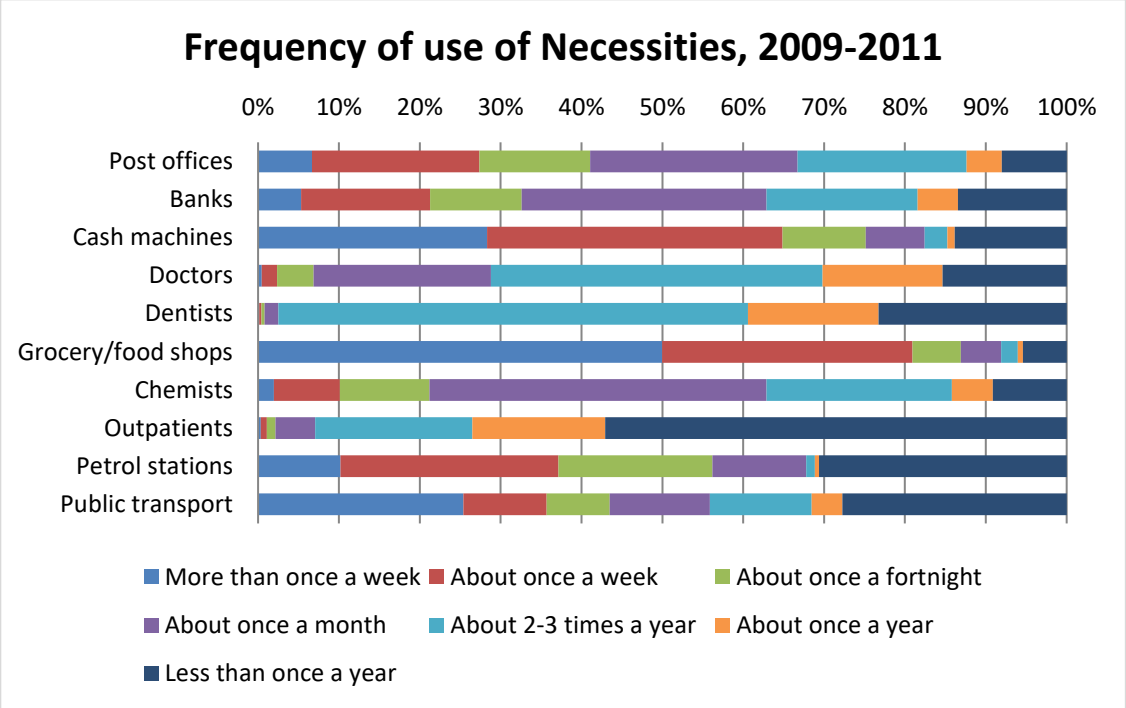


Figure 6.3 Distributions of responses to Frequency of Use of Necessities. SHS 2009-2011.

Next, Figures 6.4, 6.5 and Table 6.2 summarise bivariate relationships of Frequency of Use with the predictor variables and show the percentage of respondents in each group who used a service frequently. For the Leisure Services in 1999-2002, the responses 'used yesterday/within last week, within last month/last six months' are combined into 'used within last six months' in order to obtain sufficiently large cell counts. In the 2009-2011 Figure (6.5), the use of Leisure Services combines the responses 'most days', 'at least once a week', 'about once a month', and 'once or twice a year'.

In the Frequency of Use of Leisure Services, some groups of respondents report frequent use relatively consistently throughout the outcomes (Figs. 6.4, 6.5). Those in managerial and professional occupations, and those with higher incomes stand out as having higher use for most services. Clear patterns also appear in regard to age for most Leisure Services (Figs. 6.4 and 6.5). Younger respondents have more frequent use, and the gradient turns down after the group 36-45. With tenure, owner-occupiers and private renters have higher frequencies of use compared with social renters. However, there are

noticeable differences between services, as the initial distribution graphs showed (Figures 6.1 through 6.3). Parks have consistently the highest rates of use in all respondent groups, while in 1999-2002, museums and swimming facilities and in 2009-2011, museums and theatres/concert halls have the lowest rates of use.

For the items in 2009-2011 named Necessities, a table (Table 6.2) is included due to the high number of services in this category. The percentages consist of those using services ‘about once a month’ or more frequently. High percentages are highlighted in red for each service and low in green. There is somewhat less consistency in regard to the frequent user groups of the services included in Necessities. Larger shares of young respondents use banks, cash machines, dentists, grocery/food shops, and public transport frequently compared to older age groups. However, the Table shows clear differences between the use of services for high and low-income groups. Higher-income groups and those in managerial and professional occupations have higher rates of use of banks, cash machines, and petrol stations. In turn, more low-income respondents use post offices, doctors, chemists, and public transport frequently.

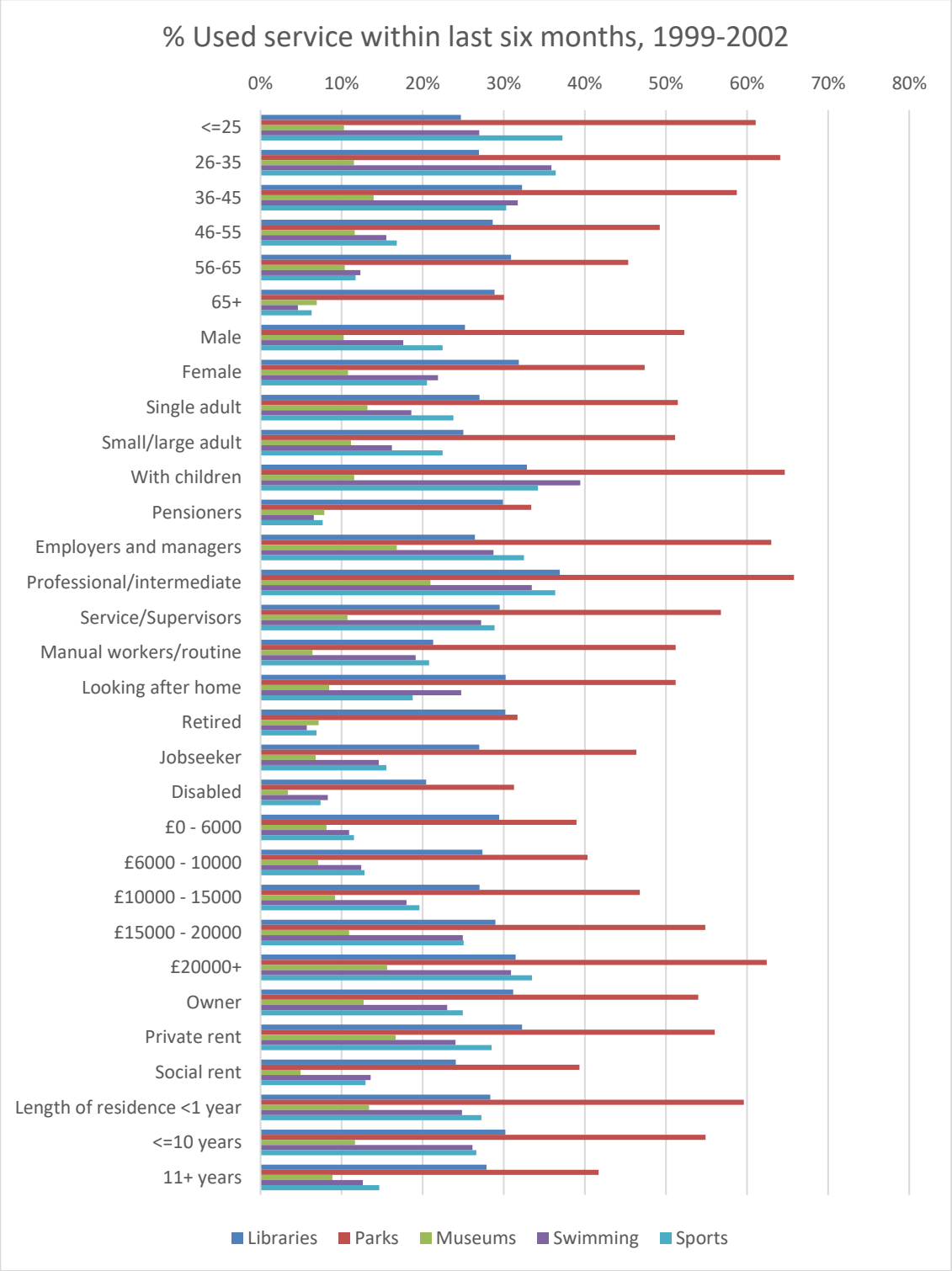


Figure 6.4 Predictor variable percentages for Frequency of Use of. Leisure Services, 99-02. SHS 1999-2002.

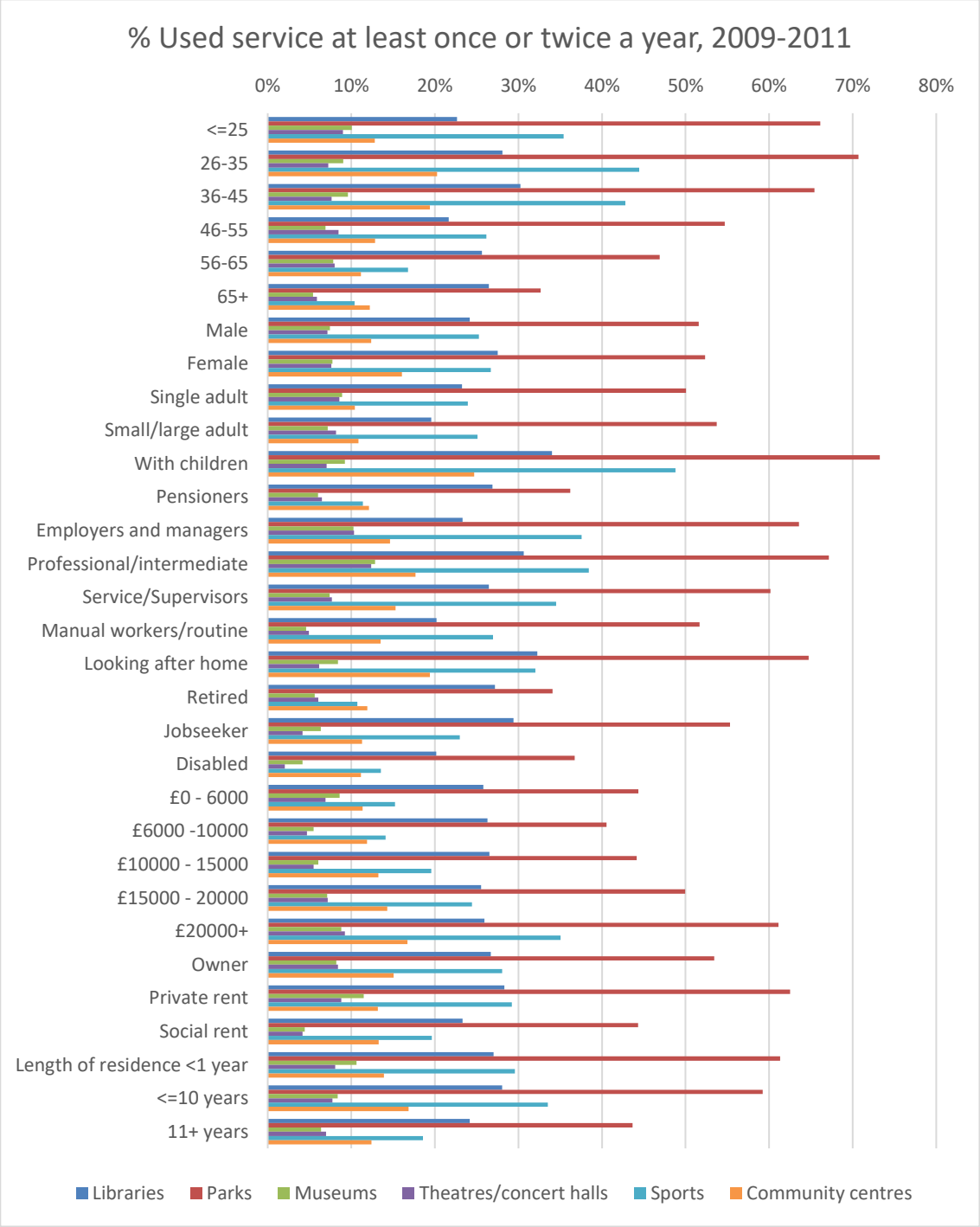


Figure 6.5 Predictor variable percentages for Frequency of Use of Leisure Services, 09-11. SHS 2009-2011.

Table 6.2 Predictor variable percentages for Frequency of Use of Necessities. SHS 2009-2011.

| | % Used service once a month or more | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency of Use of Necessities, 2009-2011** | **Post offices** | **Banks** | **Cash machines** | **Doctors** | **Dentists** | **Grocery/ food shops** | **Chemists** | **Outpatients** | **Petrol stations** | **Public transport** |
| <=25 | 59% | 71% | 96% | 27% | 5% | 98% | 51% | 6% | 45% | 73% |
| 26-35 | 66% | 67% | 95% | 28% | 3% | 97% | 59% | 7% | 72% | 57% |
| 36-45 | 63% | 64% | 92% | 24% | 3% | 95% | 57% | 6% | 77% | 52% |
| 46-55 | 64% | 64% | 89% | 24% | 3% | 93% | 58% | 6% | 74% | 51% |
| 56-65 | 69% | 62% | 84% | 29% | 2% | 91% | 67% | 8% | 74% | 53% |
| 65+ | 71% | 59% | 62% | 35% | 1% | 86% | 71% | 8% | 56% | 58% |
| Male | 66% | 63% | 84% | 27% | 2% | 93% | 59% | 7% | 72% | 53% |
| Female | 67% | 63% | 81% | 30% | 3% | 91% | 65% | 7% | 65% | 57% |
| Single adult | 65% | 62% | 89% | 28% | 3% | 95% | 57% | 7% | 61% | 59% |
| Small/large adult | 63% | 66% | 89% | 21% | 3% | 92% | 56% | 5% | 75% | 52% |
| With children | 65% | 66% | 93% | 30% | 3% | 95% | 63% | 7% | 76% | 52% |
| Pensioners | 71% | 60% | 66% | 34% | 1% | 87% | 71% | 8% | 60% | 59% |
| Employers and managers | 63% | 70% | 93% | 17% | 2% | 93% | 55% | 5% | 88% | 48% |
| Professional/intermediate | 70% | 68% | 96% | 19% | 2% | 95% | 59% | 5% | 87% | 56% |
| Service/Supervisors | 66% | 71% | 91% | 23% | 2% | 95% | 59% | 5% | 75% | 53% |
| Manual workers/routine | 61% | 63% | 89% | 22% | 3% | 93 | 53% | 5% | 71% | 48% |
| Looking after home | 70% | 59% | 83% | 43% | 5% | 93% | 74% | 11% | 58% | 58% |
| Retired | 71% | 59% | 64% | 36% | 2% | 87% | 72% | 9% | 56% | 59% |
| Jobseeker | 70% | 52% | 83% | 34% | 5% | 95% | 63% | 6% | 32% | 76% |
| Disabled | 66% | 48% | 70% | 65% | 4% | 89% | 80% | 20% | 35% | 60% |
| £0 - 6000 | 67% | 63% | 74% | 32% | 2% | 90% | 62% | 8% | 49% | 63% |
| £6000 -10000 | 68% | 56% | 70% | 34% | 2% | 91% | 66% | 7% | 44% | 64% |
| £10000 - 15000 | 69% | 60% | 75% | 37% | 2% | 91% | 68% | 8% | 52% | 62% |
| £15000 - 20000 | 65% | 63% | 83% | 31% | 3% | 92% | 63% | 8% | 66% | 55% |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| £20000+ | 65% | 66% | 91% | 22% | 2% | 93% | 59% | 6% | 84% | 49% |
| Owner | 66% | 66% | 84% | 25% | 2% | 92% | 62% | 6% | 79% | 52% |
| Private rent | 68% | 70% | 91% | 27% | 3% | 96% | 56% | 7% | 56% | 64% |
| Social rent | 67% | 54% | 75% | 41% | 3% | 91% | 68% | 10% | 38% | 64% |
| Length of residence <1 year | 64% | 66% | 91% | 29% | 4% | 96% | 58% | 7% | 56% | 65% |
| <=10 years | 66% | 64% | 89% | 29% | 3% | 94% | 61% | 7% | 71% | 56% |
| 11+ years | 67% | 62% | 75% | 29% | 2% | 89% | 65% | 7% | 67% | 54% |

*Convenience of Essential Services*

The second outcome is Convenience of Essential Services, which can be considered to represent respondents' perceptions regarding access to services. The question items are nearly consistent over two time periods, consisting of post offices, banks, doctors, small food shops, chemists, outpatients, and public transport, with the later period comprising three additional services: dentists, cash machines, and petrol stations. The group of services is therefore similar to that identified as Necessities under the first outcome, but we refer to this outcome as Convenience of Essential Services to avoid confusion.

The responses to Convenience are measured on a Likert scale from 1, very inconvenient to 5, very convenient and this scale is retained in further modelling. Majorities of respondents find all services either very convenient or fairly convenient at both time periods (Figs. 6.6, 6.7). Grocery/food shops, chemists, and in the later data, cash machines have the highest proportions of respondents reporting convenience, with outpatients consistently having the lowest proportions of convenience. The shares of respondents who consider post offices and public transport convenient are lower in 2009-2011, which is likely to reflect post office branch closures and cuts to public transport routes (Bramley & Besemer, 2018).

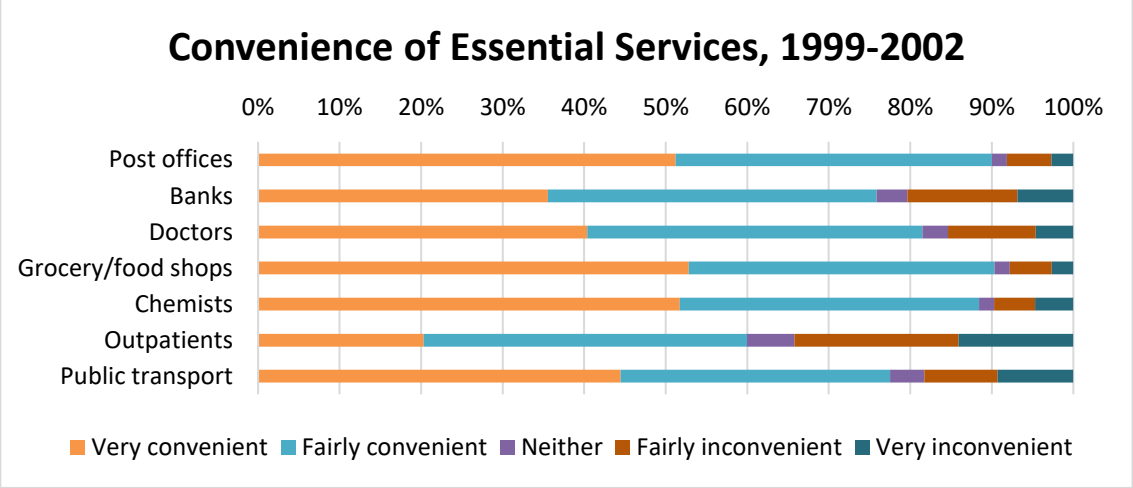


Figure 6.6 Distributions of responses to Convenience of Essential Services, 99-02. SHS 1999-2002.

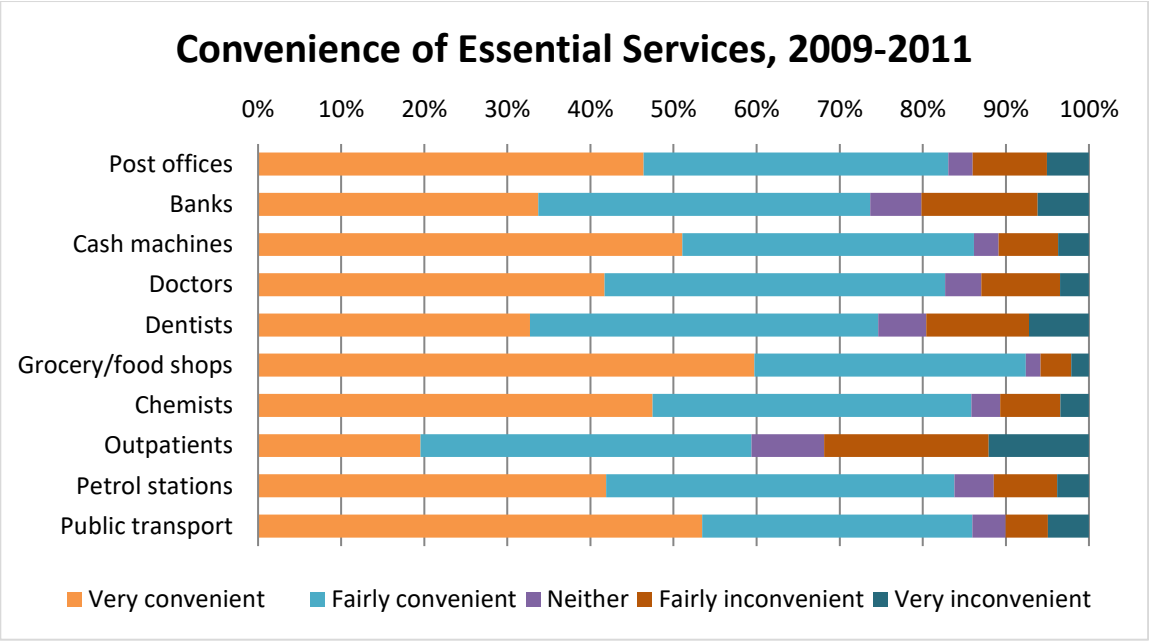


Figure 6.7 Distributions of responses to Convenience of Essential Services, 09-11. SHS 2009-2011.

Tables 6.3 and 6.4 present the distributions of respondents who find services either 'fairly' or 'very convenient' within the predictor variables of in both samples. The overall picture is nearly identical at both time periods. Proportions reporting most services convenient are higher among younger respondents (up to 36-45), adult households, those with higher incomes, and

those having lived in their dwelling up to a year. This pattern is likely to reflect the locational choices of younger people and those with resources.

There is less variation across the services that respondent groups find convenient compared to the Frequency of Use of Necessities, which is comprised of mostly the same services. A differing pattern across the services appears perhaps most clearly for the occupational categories. Higher percentages of respondents in managerial/professional occupations find food shops, chemists, and outpatients convenient. In turn, these groups have lower percentages particularly for post offices and public transport, which higher proportions of jobseekers and those looking after home find convenient (Tables 6.3, 6.4). Overall, respondents tend to find the level of Convenience similar for most services included. This suggests that Convenience relates most to location out of the three outcomes, and most likely understood as access and availability of services in the local area.

Table 6.3 Predictor variable percentages for Convenience of Services, 99-02. Essential Services, SHS 1999-2002.

| | % Find services convenient | | | | | | |
|---|---|---|---|---|---|---|---|
| **Convenience of Essential Services, 1999-2002** | **Post offices** | **Banks** | **Doctors** | **Food shops** | **Chemists** | **Outpatients** | **Public transport** |
| <=25 | 91% | 77% | 80% | 93% | 87% | 61% | 83% |
| 26-35 | 90% | 76% | 82% | 92% | 87% | 62% | 77% |
| 36-45 | 90% | 75% | 82% | 92% | 86% | 61% | 73% |
| 46-55 | 90% | 75% | 82% | 90% | 85% | 59% | 72% |
| 56-65 | 91% | 78% | 84% | 90% | 85% | 59% | 77% |
| 65+ | 87% | 75% | 78% | 85% | 82% | 54% | 78% |
| Male | 90% | 76% | 82% | 91% | 86% | 60% | 75% |
| Female | 90% | 75% | 81% | 89% | 84% | 58% | 77% |
| Single adult | 90% | 78% | 81% | 92% | 87% | 61% | 80% |
| Small/large adult | 90% | 75% | 82% | 91% | 86% | 62% | 73% |
| With children | 91% | 75% | 83% | 91% | 85% | 60% | 75% |
| Pensioners | 88% | 76% | 80% | 86% | 83% | 55% | 78% |
| Employers and managers | 89% | 76% | 82% | 93% | 86% | 65% | 68% |
| Professional/intermediate | 88% | 74% | 81% | 91% | 86% | 64% | 71% |
| Service/Supervisors | 92% | 77% | 84% | 92% | 86% | 62% | 77% |
| Manual workers/routine | 92% | 78% | 83% | 93% | 87% | 61% | 79% |
| Looking after home | 93% | 75% | 84% | 90% | 86% | 57% | 79% |
| Retired | 88% | 75% | 79% | 86% | 83% | 53% | 78% |
| Jobseeker | 93% | 75% | 83% | 91% | 85% | 56% | 86% |
| Disabled | 85% | 69% | 75% | 83% | 79% | 51% | 75% |
| £0 - 6000 | 89% | 75% | 80% | 88% | 83% | 54% | 80% |
| £6000 -10000 | 90% | 76% | 81% | 89% | 85% | 56% | 82% |
| £10000 - 15000 | 90% | 76% | 80% | 89% | 85% | 58% | 78% |
| £15000 - 20000 | 90% | 76% | 82% | 91% | 85% | 61% | 75% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| £20000+ | 89% | 75% | 82% | 91% | 85% | 64% | 69% |
| Owner | 90% | 76% | 83% | 91% | 85% | 62% | 73% |
| Private rent | 88% | 76% | 78% | 89% | 83% | 60% | 72% |
| Social rent | 90% | 75% | 79% | 89% | 84% | 53% | 84% |
| Length of residence <1 year | 90% | 76% | 79% | 91% | 86% | 59% | 79% |
| <=10 years | 89% | 75% | 81% | 90% | 85% | 60% | 76% |
| 11+ years | 90% | 76% | 82% | 89% | 84% | 58% | 76% |

Table 6.4 Predictor variable percentages for Convenience of Services, 09-11. Essential Services, SHS 2009-2011

| | % Find services convenient | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Convenience of Essential Services, 2009-2011** | **Post offices** | **Banks** | **Cash machines** | **Doctors** | **Dentists** | **Grocery/ food shops** | **Chemists** | **Out-patients** | **Petrol stations** | **Public transport** |
| <=25 | 90% | 83% | 94% | 85% | 81% | 98% | 93% | 72% | 91% | 96% |
| 26-35 | 88% | 80% | 91% | 88% | 80% | 96% | 92% | 73% | 90% | 93% |
| 36-45 | 87% | 78% | 89% | 87% | 79% | 95% | 91% | 68% | 89% | 89% |
| 46-55 | 85% | 78% | 90% | 87% | 81% | 94% | 89% | 67% | 89% | 88% |
| 56-65 | 85% | 78% | 88% | 87% | 79% | 93% | 88% | 63% | 87% | 88% |
| 65+ | 82% | 78% | 86% | 84% | 77% | 91% | 86% | 59% | 85% | 88% |
| Male | 86% | 80% | 89% | 87% | 80% | 95% | 89% | 67% | 88% | 90% |
| Female | 85% | 78% | 88% | 86% | 79% | 93% | 89% | 64% | 88% | 89% |
| Single adult | 86% | 79% | 90% | 86% | 78% | 94% | 89% | 67% | 88% | 91% |
| Small/large adult | 86% | 79% | 90% | 87% | 81% | 95% | 90% | 68% | 89% | 89% |
| With children | 88% | 78% | 89% | 88% | 80% | 95% | 91% | 69% | 89% | 89% |
| Pensioners | 82% | 78% | 86% | 85% | 78% | 92% | 86% | 59% | 86% | 89% |
| Employers and managers | 85% | 80% | 89% | 87% | 80% | 94% | 89% | 70% | 89% | 88% |
| Professional/intermediate | 84% | 78% | 90% | 87% | 79% | 96% | 91% | 71% | 89% | 88% |
| Service/Supervisors | 87% | 80% | 90% | 87% | 80% | 95% | 91% | 69% | 89% | 90% |
| Manual workers/routine | 88% | 79% | 90% | 86% | 79% | 95% | 89% | 66% | 89% | 90% |
| Looking after home | 87% | 76% | 88% | 87% | 78% | 93% | 89% | 61% | 87% | 89% |
| Retired | 83% | 78% | 86% | 84% | 77% | 92% | 86% | 59% | 86% | 89% |
| Jobseeker | 88% | 78% | 90% | 86% | 79% | 96% | 91% | 62% | 87% | 93% |
| Disabled | 82% | 71% | 85% | 81% | 75% | 92% | 86% | 57% | 83% | 90% |
| £0 - 6000 | 86% | 79% | 88% | 85% | 78% | 93% | 87% | 61% | 86% | 91% |
| £6000 -10000 | 85% | 78% | 88% | 84% | 78% | 94% | 88% | 59% | 86% | 91% |
| £10000 - 15000 | 86% | 78% | 88% | 85% | 79% | 93% | 88% | 61% | 87% | 91% |
| £15000 - 20000 | 84% | 78% | 88% | 86% | 79% | 94% | 89% | 64% | 87% | 90% |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| £20000+ | 86% | 79% | 89% | 88% | 80% | 95% | 90% | 70% | 89% | 87% |
| Owner | 85% | 79% | 89% | 87% | 80% | 94% | 89% | 67% | 89% | 88% |
| Private rent | 86% | 79% | 89% | 87% | 77% | 94% | 90% | 68% | 86% | 89% |
| Social rent | 86% | 76% | 88% | 83% | 79% | 94% | 89% | 61% | 87% | 93% |
| Length of residence <1 year | 87% | 80% | 90% | 86% | 78% | 94% | 90% | 68% | 87% | 93% |
| <=10 years | 86% | 79% | 89% | 87% | 78% | 94% | 90% | 67% | 88% | 90% |
| 11+ years | 84% | 78% | 88% | 86% | 80% | 93% | 88% | 63% | 88% | 88% |

*Satisfaction with Services*

The third outcome category used in the analysis is Satisfaction with Services. This outcome is considered important to examine as it relates to respondents' perception of the quality of services. As pointed out in the literature, if services are provided according to equal standards across small areas, we should expect little variation in the quality of services.

The SHS asks about the satisfaction of respondents with services, but the services included differ slightly in the two time periods. The 1999-2002 survey asks about satisfaction with libraries, parks, museums, swimming, and sports (Fig. 6.8). The 2009-2011 survey includes the same items with the exception of swimming, and two additional services: theatres/concert halls and community centres (Fig. 6.9). Both these groups are combined to form indicators for Leisure Services for the regression models (in 6.1.3). The 2009-2011 data includes an additional set of items that are generally managed or funded by councils (Fig. 6.10). They are grouped together as Public Services.

Satisfaction with Services is measured on a Likert scale from 'very dissatisfied' (1) to 'very satisfied' (5). Approximately 70% to 90% of respondents report being 'very' or 'fairly satisfied' with all Leisure Services at both time periods and Public Services (Figs. 6.8-6.10). It is suspected that the large numbers reporting satisfaction may in part stem from a tendency to give a positive response, as earlier studies have pointed out (e.g. Parkes et al., 2002). Satisfaction could also be an indication of contentment if respondents do not see any problems with their local services, or where they are able to fulfil needs by using services outside of their local area.

In the 1999-2002 data (Fig. 6.8), parks have the highest proportion of dissatisfaction (very of fairly dissatisfied, 9%). In the later period, sports have the highest proportion of dissatisfaction (11%) out of Leisure Services (Fig. 6.9). There is slightly more variation in the levels of Satisfaction across the Public

Services 2009-2011, where street cleaning (17%) and public transport (14%) have the highest proportions of dissatisfaction (Fig. 6.10).

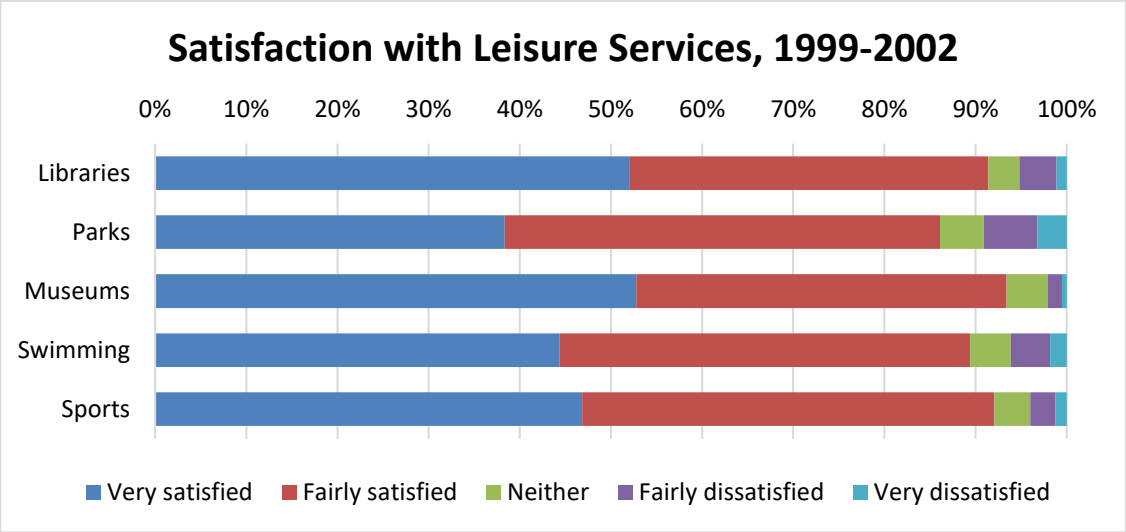


Figure 6.8 Distributions of responses to Satisfaction with Leisure Services, 99-02.SHS 1999-2002.

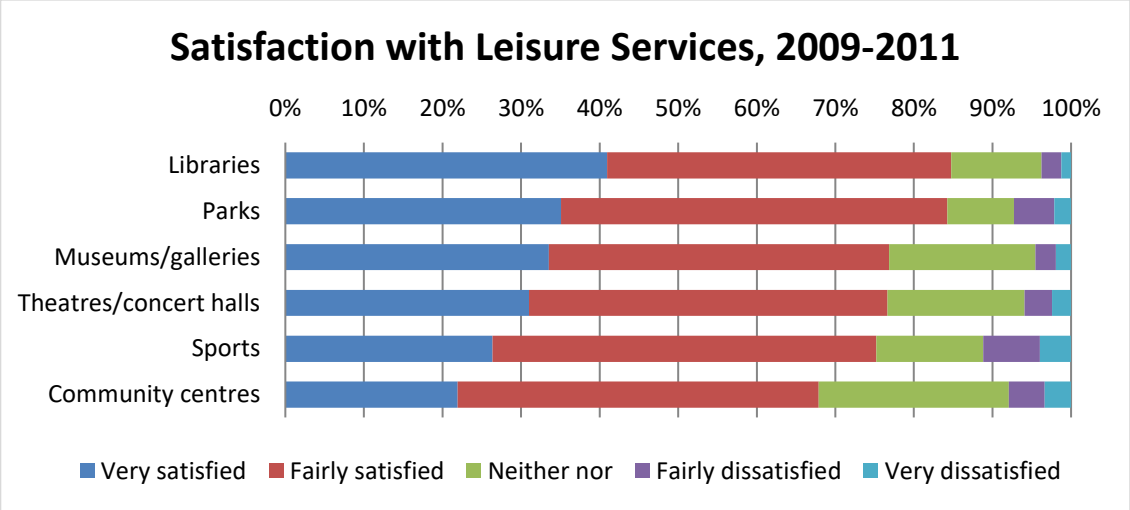


Figure 6.9 Distributions of responses Satisfaction with Leisure Services, 09-11.SHS 2009-2011.

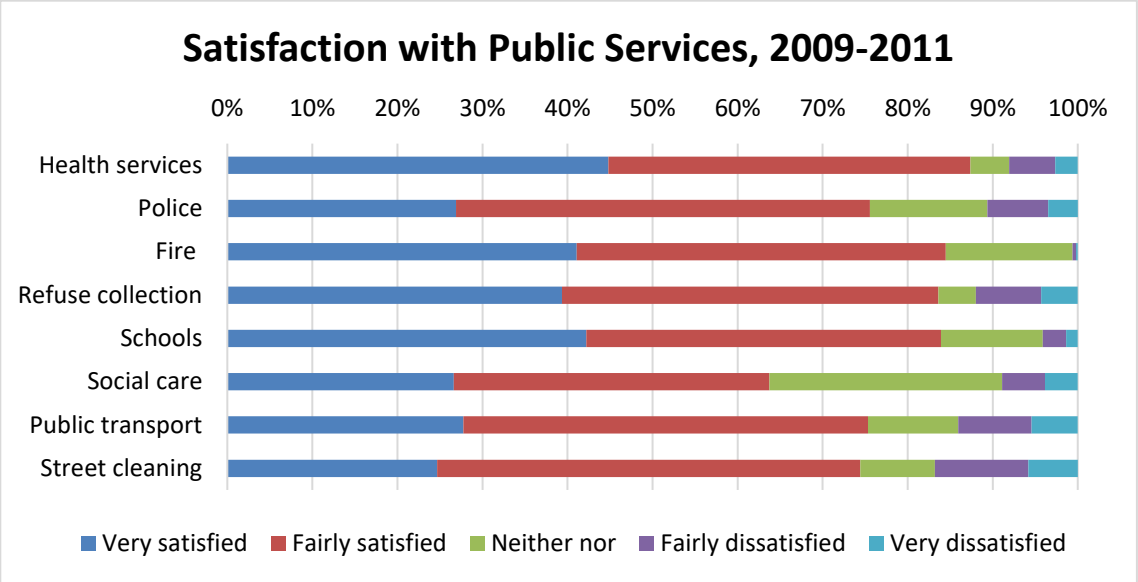


Figure 6.10 Distributions of responses to Satisfaction with Public Services. SHS 2009-2011.

Next, Figures 6.11, 6.12 and Table 6.5 show the proportions of those 'fairly' or 'very satisfied' in each service. Patterns for user groups in Satisfaction vary somewhat according to each service included. Satisfaction with Leisure Services has the clearest gradient with age, so that older age groups report more Satisfaction with most services. Satisfaction with parks is somewhat more common among older age groups, single adults and pensioners, and those in managerial and professional occupations. In turn, lower shares of jobseekers, those looking after home, and social renters consistently report satisfaction with parks. However, their rates of satisfaction are higher in the later period, which may imply some improvement. Libraries and museums have relatively similar rates of Satisfaction across respondent groups at both time periods. In 2009-2011, older respondents have higher Satisfaction rates with community centres, although younger respondents had higher rates of use of them.

In regard to Public Services, differences between user groups are less marked, as percentages of Satisfaction are generally high (Table 6.5). High percentages reporting Satisfaction stand out for older age groups, pensioners, and to some

extent private renters. Older individuals also had higher rates of frequent use of health services. Those with low to middling incomes have higher rates of satisfaction with schools, social care, and public transport, although the percentages do not show large differences in Satisfaction according to income levels. Out of tenure, fewer social renters are satisfied with street cleaning, which is likely to relate to poorer environmental services in deprived areas (e.g., Matthews et al., 2018).

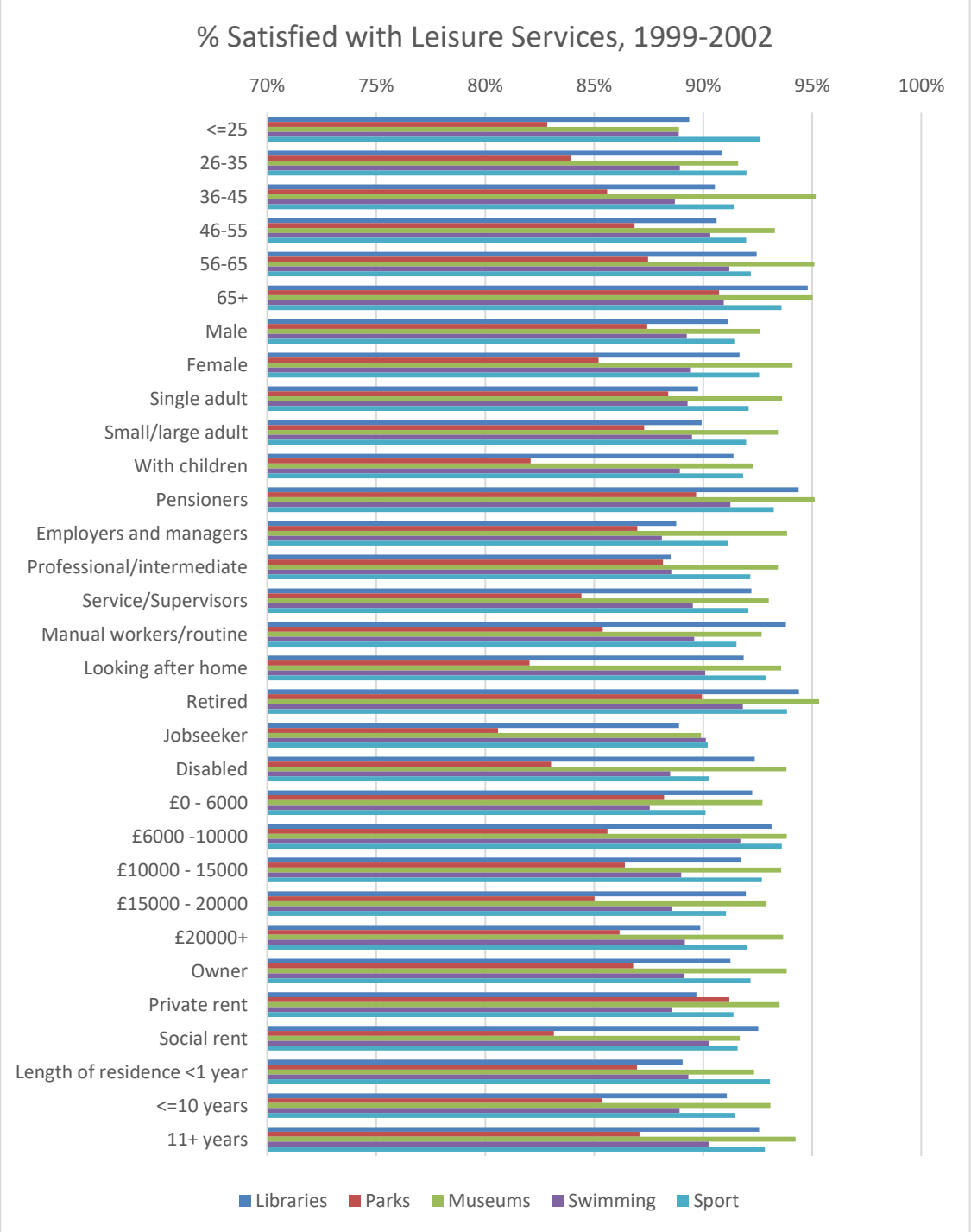


Figure 6.11 Predictor variables and Satisfaction with Leisure Services, 99-02. SHS 1999-2002.

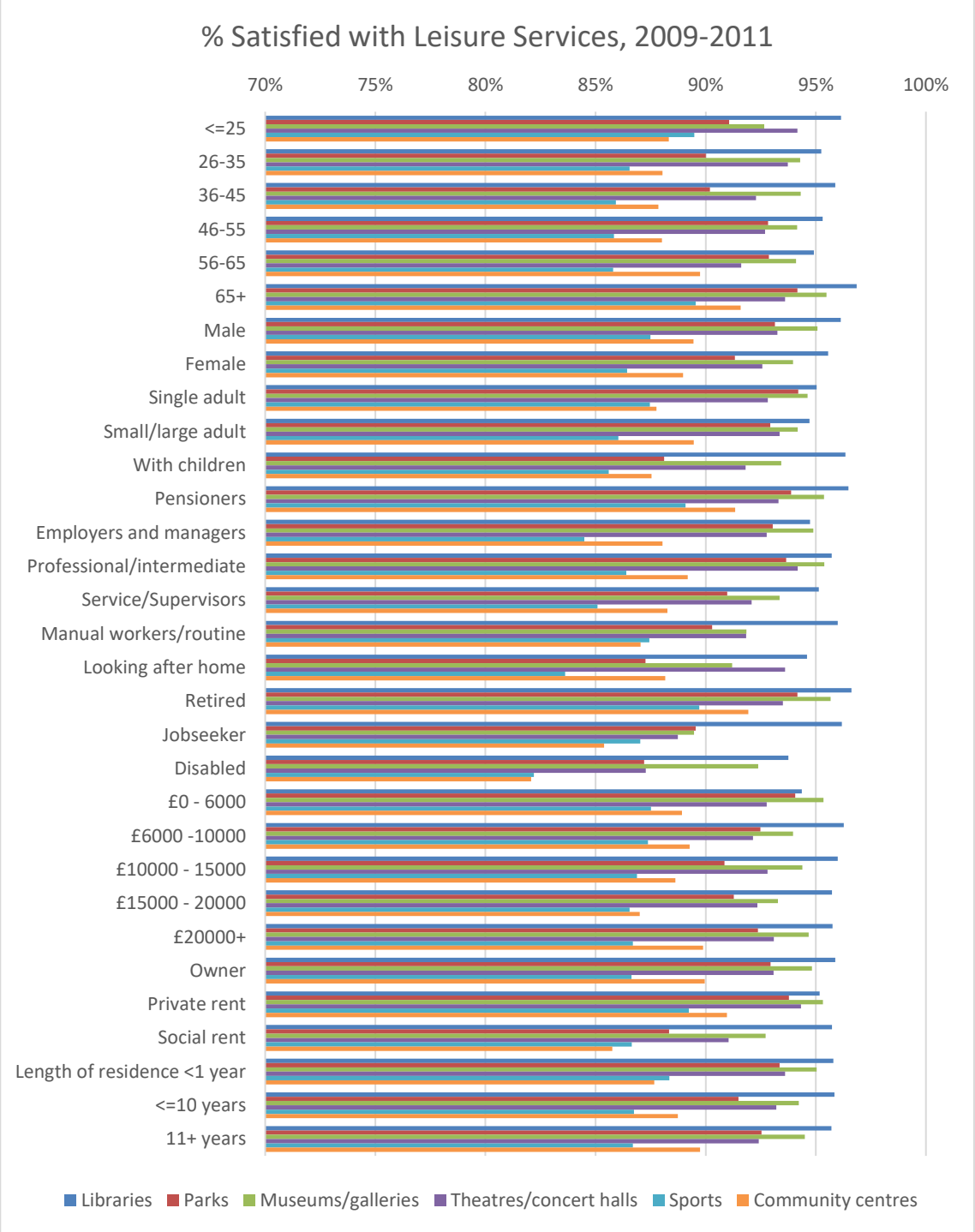


Figure 6.12 Predictor variables and Satisfaction with Leisure Services, 09-11.SHS 2009-2011.

Table 6.5 Predictor variable percentages for Satisfaction with Public Services.SHS 2009-2011.

| | % Satisfied with service | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Satisfaction with Public Services, 2009-2011** | **Health services** | **Police** | **Fire** | **Refuse collection** | **Schools** | **Social care** | **Public transport** | **Street cleaning** |
| <=25 | 89% | 86% | 98% | 83% | 95% | 85% | 88% | 84% |
| 26-35 | 90% | 88% | 99% | 80% | 95% | 86% | 85% | 81% |
| 36-45 | 90% | 88% | 99% | 83% | 95% | 86% | 82% | 82% |
| 46-55 | 90% | 86% | 99% | 86% | 95% | 84% | 80% | 81% |
| 56-65 | 92% | 87% | 99% | 88% | 96% | 87% | 83% | 80% |
| 65+ | 94% | 90% | 99% | 94% | 97% | 93% | 87% | 83% |
| Male | 92% | 86% | 99% | 88% | 96% | 89% | 85% | 82% |
| Female | 91% | 89% | 99% | 87% | 95% | 87% | 83% | 81% |
| Single adult | 91% | 86% | 99% | 87% | 95% | 84% | 86% | 83% |
| Small/large adult | 90% | 86% | 99% | 84% | 95% | 86% | 81% | 80% |
| With children | 90% | 88% | 99% | 82% | 94% | 86% | 82% | 81% |
| Pensioners | 94% | 90% | 99% | 93% | 97% | 91% | 87% | 82% |
| Employers and managers | 90% | 87% | 99% | 81% | 94% | 85% | 82% | 81% |
| Professional/intermediate | 90% | 89% | 99% | 83% | 95% | 80% | 81% | 81% |
| Service/Supervisors | 90% | 86% | 99% | 84% | 94% | 86% | 82% | 81% |
| Manual workers/routine | 91% | 85% | 99% | 87% | 96% | 90% | 83% | 82% |
| Looking after home | 88% | 86% | 99% | 83% | 93% | 87% | 83% | 82% |
| Retired | 94% | 90% | 99% | 94% | 96% | 92% | 87% | 82% |
| Jobseeker | 91% | 85% | 98% | 85% | 97% | 81% | 87% | 79% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Disabled | 90% | 81% | 99% | 87% | 93% | 85% | 84% | 83% |
| £0 - 6000 | 92% | 88% | 99% | 88% | 95% | 87% | 86% | 83% |
| £6000 -10000 | 93% | 86% | 99% | 91% | 97% | 90% | 89% | 83% |
| £10000 - 15000 | 92% | 88% | 99% | 90% | 95% | 88% | 86% | 82% |
| £15000 - 20000 | 92% | 87% | 99% | 87% | 95% | 87% | 84% | 80% |
| £20000+ | 91% | 88% | 99% | 85% | 95% | 87% | 81% | 81% |
| Owner | 92% | 89% | 99% | 87% | 95% | 88% | 83% | 80% |
| Private rent | 91% | 90% | 99% | 85% | 96% | 87% | 85% | 86% |
| Social rent | 91% | 84% | 99% | 88% | 95% | 87% | 86% | 82% |
| Length of residence <1 year | 92% | 89% | 99% | 85% | 95% | 83% | 87% | 86% |
| <=10 years | 90% | 88% | 99% | 84% | 95% | 86% | 84% | 81% |
| 11+ years | 93% | 88% | 99% | 90% | 95% | 89% | 84% | 81% |

### 6.1.3 Constructing the composite outcome indicators

The key outcome variables in the regression analysis will consist of composite indicators under each of the three outcomes. The groups of services under each outcome (Frequency of Use, Convenience, and Satisfaction) consisted of similar types of service, and held similar patterns in relation to the predictor variables, which implies that they can be combined to form composite indicators in order to include them in the regression models.

The internal consistency of each group is checked using Cronbach's alpha. The alpha indicates scale reliability, i.e., how closely related the items are as a group, with coefficients of 0.70 or higher considered indicators of good reliability (Upton & Cook, 2008). Table 6.6 summarises the alpha values for the composite outcome indicators, and the services included.

As discussed in Chapter 4, the SHS is somewhat inconsistent in regard to the services included at each time period. In order to make results from comparable, indicators for the two time periods have to consist of the same services. The datasets provide three indicators that are consistent at both time periods: Frequency of Use of Leisure Services, Convenience of Essential Services, and Satisfaction with Leisure Services. In addition to these, there are two further composite indicators for the later period only as this covered a wider range of services and outcomes. These are: Frequency of Use of Necessities and Satisfaction with Public Services.

With Frequency of Use of Leisure Services, the items included in both datasets cover four services (libraries, parks, museums, sports). Reliability coefficients are quite similar at the two time periods (0.59, and 0.60), and are considered acceptable. The 2009-2011 items under Frequency of Use of Necessities yield an alpha of 0.51, which is lower than recommended. This implies that there is more variation in the Frequency of Use of these services, which could be expected considering the somewhat varying types of services included.

However, the grouping with these services is considered important, as they comprise services that most people require access to locally. Therefore all the items are included in the indicator for Frequency of use of Necessities (Table 6.6).

The items measured in Convenience of Essential Services is formed of seven services (post offices, banks, outpatients, small food shops, doctors, chemists, and public transport). Convenience has the highest internal consistency out of the outcomes, with alpha values of 0.83 in 1999-2002 and 0.82 in 2009-2011. While it could be argued that only the 'very (in)convenient' responses truly address respondents' perceptions of convenience, the full scale is retained for the purpose of forming the indicators of Convenience, as the variation in responses will be reflected in the linear indicator.

Finally, Satisfaction was measured for Leisure Services in both samples and additionally for Public Services in the later years only. A consistent indicator for Leisure Services uses the four services included in both surveys: libraries, parks, museums, and sports. The alpha for Leisure Services is slightly lower in the first time period ($a$=0.59 compared to the later period, $a$=0.70) and corresponds to the alpha of Frequency of Use, which consists of the same items. Satisfaction with Public Services further shows good internal consistency with an alpha of 0.70.

Table 6.6 The composite indicators for the service outcomes, Cronbach's alpha.SHS 1999-2002, 2009-2011.

| **Outcome indicators** | **Services included** | **N items** | **1999-2002** | **2009-2011** |
|---|---|---|---|---|
| Frequency of Use of Leisure Services | Libraries, parks, museums, sports | 4 | 0.59 | 0.60 |
| Frequency of Use of Necessities | Post offices, banks, cash machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, public transport | 8 | | 0.51 |
| Convenience of Essential Services | Post offices, banks, outpatients, small food shops, doctors, chemists, public transport | 7 | 0.83 | 0.82 |
| Satisfaction with Leisure Services | Libraries, parks, museums, sports | 4 | 0.59 | 0.70 |
| Satisfaction with Public Services | Health, police, fire, refuse collection, schools, social care, public transport, street cleaning | 8 | 0.70 | 0.70 |

To make the composite indicator, the original response categories of the variables are used as detailed in Table 6.7. The composite indicator is formed by taking the average of each respondent's values ignoring missing responses to any item. In this way, missing responses do not skew the resulting scale. All the indicators in further sections are formed in this way. This provides scales as shown in Table 6.7. Figures 6.13 and 6.14 present the distributions of responses in each scale at both time periods respectively. Frequency of Use of Leisure Services tends to have more responses in the lower end of the scale, indicating lower frequency of use, while responses for Frequency of Use of Necessities are more concentrated around the middle. The scales for Convenience and Satisfaction have higher means compared to Frequency (as shown in Table 6.7), indicating higher average levels, which is reflected in the tendency to higher values in their distributions (Figs. 6.13, 6.14). Satisfaction with Leisure Services stands out with very little variation, with peaks in its distribution at the high end (Figs. 6.13, 6.14).

Table 6.7 Descriptive statistics of the composite outcome indicators.SHS 1999-2002 and 2009-2011.

| **1999-2002 Indicator** | **N** | **Mean** | **Std. Dev.** | **Min** | **Max** |
|---|---|---|---|---|---|
| Frequency of Use of Leisure Services | 27,804 | 3.00 | 1.20 | 1 | 7 |
| Convenience of Essential Services | 27,896 | 3.96 | 0.83 | 1 | 5 |
| Satisfaction with Leisure Services | 20,495 | 4.26 | 0.74 | 1 | 5 |
| **2009-2011 Indicator** | | | | | |
| Frequency of Use of Leisure Services | 29,992 | 2.35 | 0.84 | 1 | 6 |
| Frequency of Use of Necessities | 30,044 | 3.84 | 0.71 | 1 | 7 |
| Convenience of Essential Services | 30,029 | 4.02 | 0.78 | 1 | 5 |
| Satisfaction with Leisure Services | 26,118 | 4.08 | 0.73 | 1 | 5 |
| Satisfaction with Public Services | 29,953 | 4.00 | 0.61 | 1 | 5 |

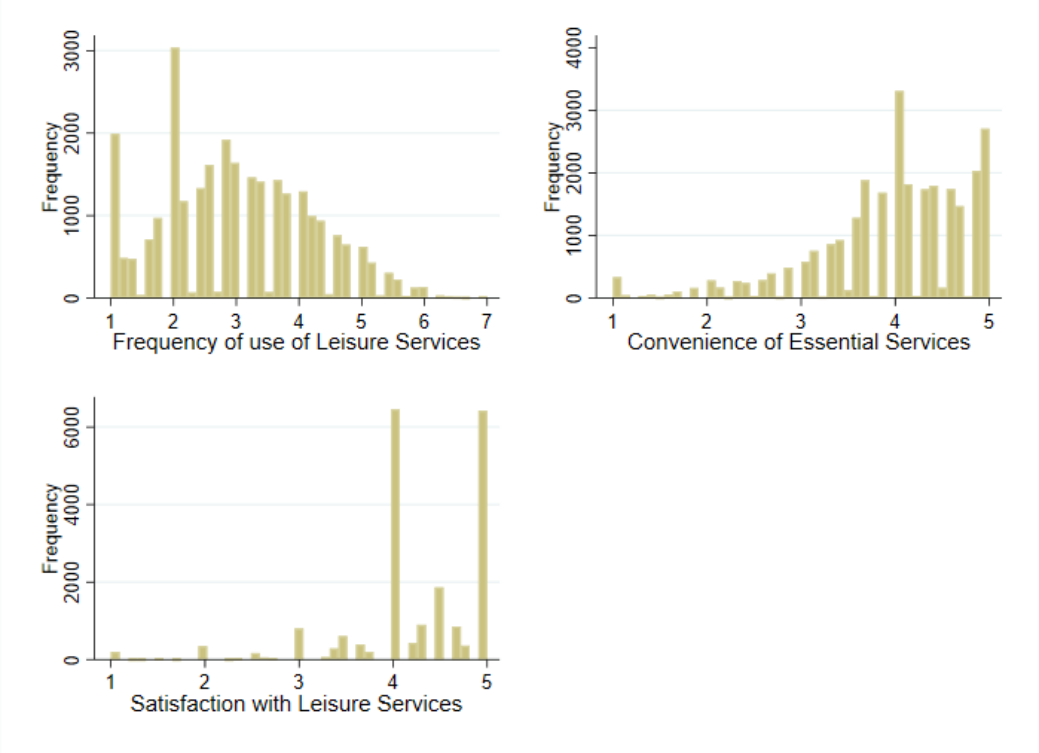


Figure 6.13 Distributions of responses in service outcome indicators, 99-02.SHS 1999-2002.

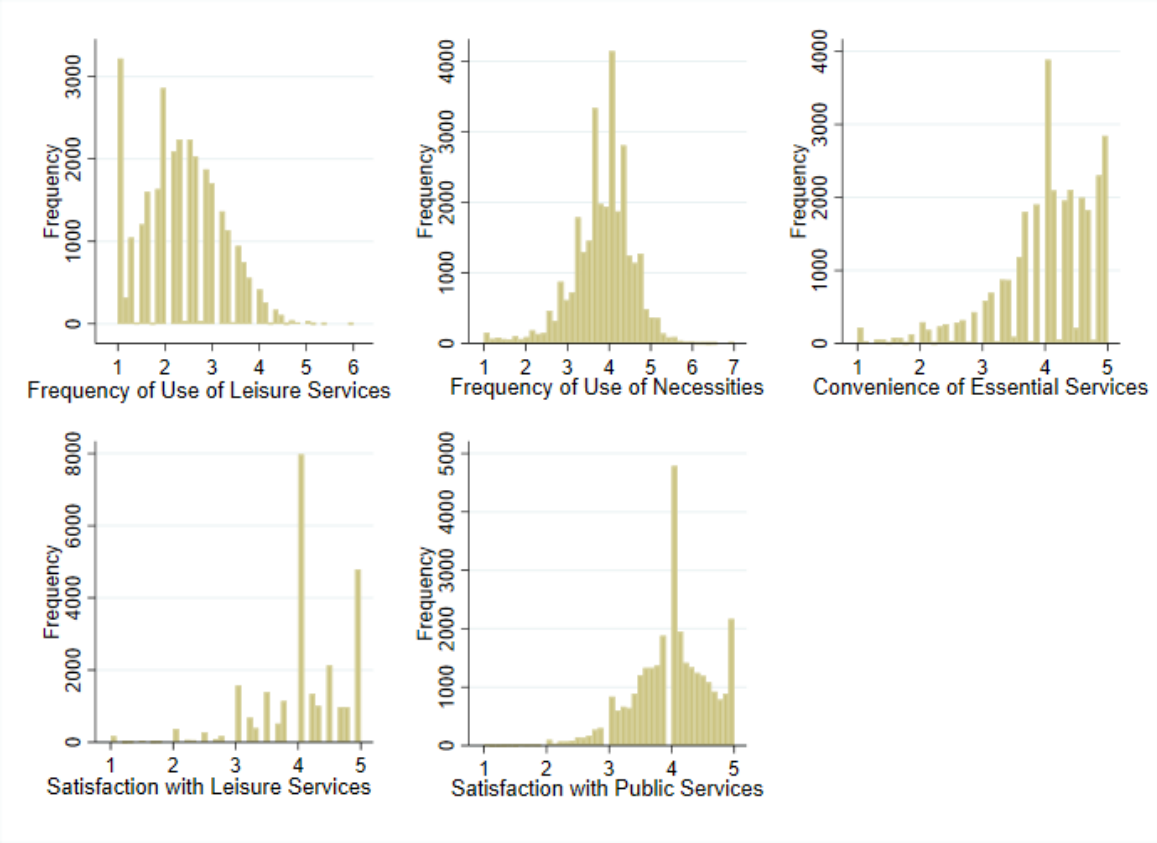


Figure 6.14 Distributions of responses in service outcome indicators, 09-11. SHS 2009-2011.

## 6.2 Regression models

### 6.2.1 Frequency of Use of Services

The composite indicators for Frequency of Use comprise the Leisure Services measures for each period and the Necessities measure for the later time period. Tables 6.8 and 6.9 include the results from the linear regression models for these three indicators against the individual and household predictor variables. These predictors account for 24% of the variation in Frequency of use of Leisure Services in 1999-2002, but only 13% in the later period (Table 6.8). The least amount of variation is explained for Necessities, around 5% (Table 6.9).

Age is a strong predictor for the Frequency of use of Leisure Services at both time periods. In 1999-2002, frequent use of Leisure Services is less likely for all age groups over 25 and decreasingly so up to the oldest age group. Meanwhile, in 2009-2011 only the three last age groups have significantly decreased likelihood of frequency, and the coefficients are slightly weaker. Coefficients for other predictors are relatively consistent at both time periods. Women and households with children tend to be more frequent users of Leisure Services, as well as individuals in professional/intermediate occupations and with higher incomes, the coefficients being strongest for those earning £20,000+. As to the housing predictors, both private and social renters are less likely to use services frequently compared to owner-occupiers, social rent being a stronger predictor than private rent at each time period. Perhaps surprisingly, those who have lived in the area longer (11+ years) tend to use services significantly less frequently in 1999-2002 but not in the later survey.

Turning to the Frequency of use of Necessities, the household variables follow a similar pattern to that in Leisure Services, but age is not as strong a predictor. While older age groups have negative coefficients, only the 65+ group is significantly less likely to use Necessities frequently. Households with children

tend to use these services more frequently than average, but women less frequently. Professional/intermediate occupations and higher incomes predict more frequent use again, but not very strongly. Frequent use is significantly less likely for those in manual/routine occupations, retired, jobseekers, social renters and those having lived in the area for 11+ years.

In summary, the household variables predict Frequency of use in a rather similar manner for Leisure Services and Necessities. Necessities however yield weaker associations with the predictors. Furthermore, there was little change over time in the predictors for Leisure Services, with age being a slightly weaker predictor in the later time period.

Table 6.8 Regression model results for the indicators of Frequency of Use of Leisure Services.SHS 1999-2002, 2009-2011.

| | **Frequency of Use of Leisure Services, 1999-2002** | | **Frequency of Use of Leisure Services, 2009-2011** | |
|---|---|---|---|---|
| | **b** | **se** | **b** | **se** |
| <=25 | 0 | . | 0 | . |
| 26-35 | -.0960716*** | 0.0287388 | 0.0142517 | 0.0295862 |
| 36-45 | -.1953256*** | 0.0291916 | -0.0115606 | 0.0293597 |
| 46-55 | -.4243005*** | 0.0299536 | -.1408757*** | 0.0296328 |
| 56-65 | -.4467968*** | 0.033565 | -.1593174*** | 0.031666 |
| 65+ | -.7319831*** | 0.0435761 | -.2789244*** | 0.0367386 |
| Male | 0 | . | 0 | . |
| Female | .0801495*** | 0.014047 | .0391263*** | 0.0110486 |
| Single adult | 0 | . | 0 | . |
| Small/large adult | -.1919606*** | 0.0234514 | -.0800697*** | 0.0183417 |
| With children | .2514528*** | 0.0238113 | .2794095*** | 0.0194524 |
| Pensioners | -.1140643*** | 0.0330408 | 0.021035 | 0.0232797 |
| Employers and managers | 0 | . | 0 | . |
| Professional/Intermediate | .231039*** | 0.0292714 | .146482*** | 0.0260332 |
| Service/Supervisors | -.0934426*** | 0.0280825 | -0.0475703 | 0.0255196 |
| Manual workers/routine | -.3743954*** | 0.0293591 | -.2010768*** | 0.0268746 |
| Looking after home | -.2854372*** | 0.036217 | -.109601*** | 0.0327863 |
| Retired | -.2287745*** | 0.036581 | -.1068581*** | 0.0295165 |
| Jobseeker | -.3494303*** | 0.0552019 | -.0844717* | 0.0389055 |
| Disabled | -.6027524*** | 0.0398974 | -.2594771*** | 0.0322142 |
| £0-6000 | 0 | . | 0 | . |
| £6000-10000 | 0.0201011 | 0.0221615 | -0.0064949 | 0.0255586 |
| £10-15000 | .0589501* | 0.023329 | 0.0384051 | 0.0246846 |
| £15-20000 | .0851303** | 0.0266525 | .0643268* | 0.0259448 |
| £20000+ | .2407484*** | 0.0267259 | .1047714*** | 0.025064 |
| Owner | 0 | . | 0 | . |
| Private rent | -.0895291** | 0.032519 | -.1021446*** | 0.0212806 |
| Social rent | -.3616546*** | 0.0163745 | -.2192581*** | 0.0140573 |
| <1 year | 0 | . | 0 | . |
| <=10 years | -0.0097576 | 0.0257091 | 0.0398469 | 0.0224876 |
| 11+ years | -.1073242*** | 0.027487 | -0.0336089 | 0.023944 |
| Constant | 3.568497*** | 0.0460773 | 2.460946*** | 0.0443377 |
| R2 | 0.2392645 | | 0.1292543 | |
| N | 25620 | | 22333 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

Table 6.9 Regression model results for the indicator of Frequency of Use of Necessities.SHS 2009-2011.

| | **Frequency of Use of Necessities, 2009-2011** | |
|---|---|---|
| | **b** | **se** |
| <=25 | 0 | . |
| 26-35 | 0.0316536 | 0.026278 |
| 36-45 | -0.0408077 | 0.0260784 |
| 46-55 | -0.0457346 | 0.0264589 |
| 56-65 | -0.0198652 | 0.0282477 |
| 65+ | -.183721*** | 0.0327311 |
| Male | 0 | . |
| Female | -.0290036** | 0.0098626 |
| Single adult | 0 | . |
| Small/large adult | -0.0061381 | 0.0163345 |
| With children | .1354048*** | 0.0171328 |
| Pensioners | 0.033516 | 0.0206726 |
| Employers and managers | 0 | . |
| Professional/Intermediate | .0528938* | 0.0231252 |
| Service/Supervisors | 0.0209086 | 0.0226519 |
| Manual workers/routine | -.1139098*** | 0.023703 |
| Looking after home | -0.0060976 | 0.0293575 |
| Retired | -.0742802** | 0.0261695 |
| Jobseeker | -.1064879** | 0.0345364 |
| Disabled | -0.0194216 | 0.0290022 |
| £0-6000 | 0 | . |
| £6000-10000 | 0.0175488 | 0.0234026 |
| £10-15000 | .0931995*** | 0.0224665 |
| £15-20000 | .0980385*** | 0.0235181 |
| £20000+ | .0918186*** | 0.0226929 |
| Owner | 0 | . |
| Private rent | -0.0117063 | 0.0189203 |
| Social rent | -.0900734*** | 0.012619 |
| <1 year | 0 | . |
| <=10 years | 0.0309112 | 0.0201779 |
| 11+ years | -.0438432* | 0.0215558 |
| Constant | 3.875427*** | 0.0392659 |
| R2 | 0.0546185 | |
| N | 22435 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | |

### 6.2.2 Convenience of Services

The second outcome, convenience of services, is examined through a consistent indicator for both time periods covering Essential Services. Overall, the coefficients of the predictors are small and the R-squared values remain very low for both models, indicating that household variables explain around 1% of the variation in Convenience (Table 6.10). Given that these same variables had some relationship with frequency of use of services, the lack of relation with judgements about convenience is striking.

In line with the small amount of variation explained, Convenience has fewer consistent relationships with the household variables. Age is a significant negative predictor for Convenience In both time periods. Age groups over 35 are less likely to find services convenient, with those over 65 having the strongest coefficients (*b* = -0.17 and -0.18,). The coefficients are slightly larger for the 46-65 groups in the later period. Furthermore, those with disabilities are noticeably less likely to find services convenient (in 1999-2002, *b*=-0.23, *p*<0.001), and women slightly less likely than men in both models (*b*=-0.04 and *b*=-0.05, both p<0.001).

In the 1999-2002 model, all household types have a smaller average likelihood of Convenience compared to single adults, but this does not hold in the 2009-2011 model. Similarly, two occupational groups and the second lowest income group are significant positive predictors in the first time period, while occupation and income do not predict Convenience in the later time period. Out of tenure, only private renters have a smaller average likelihood of finding services convenient in the first period (*b*=-0.12, *p*<0.001), and this does not hold in the later period. Longer length of residence yields negative, but non-significant coefficients, which may indicate collinearity with older age.

Fewer household variables explain variation in Convenience compared to the Frequency of use of Services. However, older age and disability were strong

negative predictors of Convenience, which is likely to relate to lower levels of mobility for these groups. There also appears to be less consistency in the relationships with the predictors over time. The household types other than single adults and private renters did not remain significant negative predictors in the later time period, which may imply that convenience improved for these groups over time. Moreover, the pattern with age and household type is likely related to location, as inner cities hold more young and single adults.

The low amount of variation explained by the household-level models for Convenience suggest that location overall is important in explaining levels of Convenience for service users, as the perception of Convenience is strongly related to access. Therefore we expect the area variables to bring more information into the models in the next chapter.

Table 6.10 Regression model results for the indicators of Convenience of Essential Services.SHS 1999-2002, 2009-2011.

| | **Convenience of Essential Services, 1999-2002** | | **Convenience of Essential Services, 2009-2011** | |
|---|---|---|---|---|
| | **b** | **se** | **b** | **se** |
| <=25 | 0 | . | 0 | . |
| 26-35 | -0.0293669 | 0.0225998 | -0.0173851 | 0.0295071 |
| 36-45 | -.0639071** | 0.0229473 | -.089561** | 0.0292711 |
| 46-55 | -.0884505*** | 0.0235524 | -.1369615*** | 0.0297026 |
| 56-65 | -0.0496098 | 0.026378 | -.1242589*** | 0.031715 |
| 65+ | -.1749527*** | 0.0342294 | -.1767084*** | 0.0367563 |
| Male | 0 | . | 0 | . |
| Female | -.0415132*** | 0.0110327 | -.0481985*** | 0.0110795 |
| Single adult | 0 | . | 0 | . |
| Small/large adult | -.0918788*** | 0.0184285 | 0.0157468 | 0.0183412 |
| With children | -.1060825*** | 0.0187168 | 0.0120379 | 0.019236 |
| Pensioners | -.052202* | 0.0259437 | 0.0132281 | 0.0232158 |
| Employers and managers | 0 | . | 0 | . |
| Professional/Intermediate | 0.0030891 | 0.0230119 | 0.0078381 | 0.0259724 |
| Service/Supervisors | .0537855* | 0.022069 | 0.0303426 | 0.025442 |
| Manual workers/routine | 0.033446 | 0.0230714 | -0.0155005 | 0.0266171 |
| Looking after home | .065951* | 0.028453 | -0.0165615 | 0.0329693 |
| Retired | -0.0388662 | 0.0287102 | -0.0382353 | 0.0293933 |
| Jobseeker | -0.0027719 | 0.0434204 | 0.0137014 | 0.0387876 |
| Disabled | -.2294131*** | 0.0313548 | -.1448494*** | 0.0325518 |
| £0-6000 | 0 | . | 0 | . |
| £6000-10000 | .0452342** | 0.0173958 | 0.0154934 | 0.0262869 |
| £10-15000 | -0.0114869 | 0.0183149 | 0.0225852 | 0.0252334 |
| £15-20000 | -0.0100705 | 0.0209329 | -0.0127134 | 0.0264053 |
| £20000+ | -0.0333467 | 0.0209954 | -0.0221651 | 0.0254837 |
| Owner | 0 | . | 0 | . |
| Private rent | -.1214372*** | 0.0255347 | -0.0107669 | 0.0212418 |
| Social rent | -0.0230575 | 0.0128574 | 0.0233389 | 0.01418 |
| <1 year | 0 | . | 0 | . |
| <=10 years | -0.0349642 | 0.0201876 | 0.0257233 | 0.0226442 |
| 11+ years | -0.0127711 | 0.0215841 | 0.0052999 | 0.0241956 |
| Constant | 4.183117*** | 0.0362019 | 4.148572*** | 0.0441041 |
| R2 | 0.0134305 | | 0.0103448 | |
| N | 25704 | | 22429 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

Note: Essential services: Post offices, banks, outpatients, small food shops, doctors, chemists, public transport.

### 6.2.3 Satisfaction with Services

Finally, two regression models are undertaken for the consistent indicator for Satisfaction with Leisure Services, and an additional model for the Public Services indicator in the later period.

Satisfaction with Leisure Services has smaller sample sizes compared to the other outcomes, remaining under 20,000 at both time periods. This was because these questions were only asked of a random subset of all respondents. The R-squared values imply that the individual-level model explains a small amount of the total variation for each outcome: for Leisure Services, 3% in 1999-2002 and 2% in 2009-2011, and 4% for Public Services in 2009-2011 (Tables 6.11, 6.12). As shown in the descriptive graphs, responses in Satisfaction have more limited variation compared to the other outcomes. The overall pattern in coefficients is less straightforward than with the previous outcomes, while there are similarities.

Satisfaction with Leisure Services has relatively consistent relationships with the predictors over time. Age has a clear pattern in the first time period, so that the likelihood of reporting Satisfaction increases with age, while in the later period only the 56-65 and 65+ groups are significantly more likely than average to report this. Households with more than one adult and with children are significantly less likely to be satisfied with Leisure Services than single adults in both models. The occupation groups tend to have negative coefficients, but only those for jobseekers and the disabled are significant in 1999-2002. Interestingly, private renters have a somewhat higher than average likelihood of reporting Satisfaction, while social renters lower than average, and this is consistent in both time periods. Longer length of residence predicts Satisfaction negatively particularly in the later period (those having lived 11+ years, $b$=-0.12, $p$<0.001).

The patterns in Satisfaction with Leisure Services seem to inversely reflect the outcomes with Frequency of use of Leisure Services in regard to age: while older age groups tend to use services less frequently, they are more likely to be satisfied with them. This may imply a bias towards reporting satisfaction, or that older people do not experience certain problems with the services

provided despite using them less. In turn, households with children were found to have higher levels of use, but lower average levels of satisfaction, which may reflect problems with inadequacy or cost in these services for families which are not experienced by older people.

The negative outcome for social renters may stem from inadequate provision or cost issues for this group, while it can also reflect unavailability or poorer quality of Leisure Services near social rent-dominated areas. In turn, private renters may experience more choice or higher quality in Leisure Services through their location. The inadequacy of services in rural and suburban areas is also likely to contribute to the lower levels of satisfaction for those having lived long in their dwelling, while it is possible that their expectations play a part in this.

Turning to Satisfaction with Public Services, fewer predictors show significant relationships with the outcome (Table 6.12). As with Leisure Services, age is a strong predictor so that average levels of Satisfaction tend to increase with age. The positive coefficient for retired individuals is consistent with this. As a difference to Leisure Services, both private and social renters are more likely to be satisfied with Public Services compared to owner-occupiers. The outcome for social renters is unexpected and somewhat contradictory to previous research. It is suspected that this may partly reflect different expectations and possibly locational issues, which were not controlled for.

Private and social renters may perceive Public Services as adequate and therefore express satisfaction with them more readily, whereas owners' might hold higher expectations, this being in line with research findings on middle-class residents expressed demands and engagement with their public services (Hastings & Matthews, 2011). Availability of many services may also contribute to more positive perceptions for renters compared to the large amount of home-owners in rural areas.

Overall, Satisfaction with both Leisure and Public Services show a similar pattern with age, but slightly different relationships with the tenure groups. It was suggested that location contribute to the outcomes particularly with tenure, and this will be the focus of the next chapter. Furthermore, satisfaction levels are likely to vary depending on the service and therefore the composite indicator does not provide a clear picture. Separate models for the services will be undertaken in the following analysis.

Table 6.11 Regression model results for the indicators of Satisfaction with Leisure Services. SHS 1999-2002, 2009-2011.

| | **Satisfaction with Leisure Services, 1999-2002** | | **Satisfaction with Leisure Services (consistent), 2009-2011** | |
|---|---|---|---|---|
| | **b** | **se** | **b** | **se** |
| <=25 | 0 | . | 0 | . |
| 26-35 | .0795502*** | 0.021617 | 0.0311711 | 0.028719 |
| 36-45 | .1361691*** | 0.022188 | 0.0441701 | 0.028601 |
| 46-55 | .1716566*** | 0.023146 | 0.0332104 | 0.0290623 |
| 56-65 | .2397093*** | 0.026902 | .1006801** | 0.0312229 |
| 65+ | .3601352*** | 0.03693 | .1482205*** | 0.0365383 |
| Male | 0 | . | 0 | . |
| Female | 0.0199964 | 0.011533 | -0.0034803 | 0.0110889 |
| Single adult | 0 | . | 0 | . |
| Small/large adult | -.0583612** | 0.018794 | -.0471077* | 0.0183089 |
| With children | -.1029399*** | 0.018586 | -.0716295*** | 0.0190581 |
| Pensioners | -0.0277786 | 0.028328 | 0.0214771 | 0.0236304 |
| Employers and managers | 0 | . | 0 | . |
| Professional/Intermediate | 0.0179307 | 0.021847 | .0547821* | 0.0250329 |
| Service/Supervisors | -0.0115773 | 0.021268 | -0.0151766 | 0.0247035 |
| Manual workers/routine | -0.031457 | 0.022621 | -0.0449121 | 0.0262054 |
| Looking after home | -0.0385906 | 0.028408 | -0.0336203 | 0.031999 |
| Retired | -0.0364041 | 0.030343 | 0.0161308 | 0.0291911 |
| Jobseeker | -.1129907* | 0.045902 | -0.004955 | 0.0382572 |
| Disabled | -.0813777* | 0.035214 | -0.0501577 | 0.0324697 |
| £0-6000 | 0 | . | 0 | . |
| £6000-10000 | -0.0070868 | 0.020232 | 0.0142035 | 0.0267007 |
| £10-15000 | -0.010106 | 0.020685 | -0.0029689 | 0.0256636 |
| £15-20000 | -0.0249475 | 0.022748 | 0.0057849 | 0.0268274 |
| £20000+ | 0.023287 | 0.022626 | 0.0260095 | 0.0258501 |
| Owner | 0 | . | 0 | . |
| Private rent | .0790004** | 0.025937 | .0684727** | 0.0213419 |
| Social rent | -.0610938*** | 0.01436 | -.0567002*** | 0.0144497 |
| <1 year | 0 | . | 0 | . |
| <=10 years | -0.0318135 | 0.020173 | -.0807227*** | 0.0224089 |
| 11+ years | -.0537287* | 0.022015 | -.1207885*** | 0.0239875 |
| Constant | 4.205821*** | 0.036495 | 4.103845*** | 0.0441749 |
| R2 | 0.02834 | | 0.0170769 | |
| N | 18822 | | 19261 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

Note: Leisure services: Libraries, parks, museums, sports.

Table 6.12 Regression model results for the indicator of Satisfaction with Public Services.SHS 2009-2011.

| | **Satisfaction with Public Services, 2009-2011** | |
|---|---|---|
| | **b** | **se** |
| <=25 | 0 | . |
| 26-35 | 0.0263373 | 0.0227507 |
| 36-45 | .0616985** | 0.0225795 |
| 46-55 | .0804941*** | 0.0227795 |
| 56-65 | .1539322*** | 0.0243387 |
| 65+ | .2636891*** | 0.0282276 |
| Male | 0 | . |
| Female | -0.0076125 | 0.0084832 |
| Single adult | 0 | . |
| Small/large adult | -.0348268* | 0.0140839 |
| With children | 0.0272097 | 0.0149361 |
| Pensioners | -0.0029277 | 0.0178695 |
| Employers and managers | 0 | . |
| Professional/Intermediate | 0.0068109 | 0.0199782 |
| Service/Supervisors | -0.0089856 | 0.019581 |
| Manual workers/routine | 0.0261299 | 0.0206245 |
| Looking after home | 0.0172349 | 0.0251696 |
| Retired | .074749*** | 0.0226454 |
| Jobseeker | 0.0318939 | 0.0298566 |
| Disabled | 0.0192054 | 0.0247196 |
| £0-6000 | 0 | . |
| £6000-10000 | 0.0269549 | 0.0196418 |
| £10-15000 | 0.0152819 | 0.0189675 |
| £15-20000 | 0.0004137 | 0.0199423 |
| £20000+ | 0.0153493 | 0.0192588 |
| Owner | 0 | . |
| Private rent | .0541097*** | 0.0163582 |
| Social rent | .0384486*** | 0.0107902 |
| <1 year | 0 | . |
| <=10 years | -0.0262078 | 0.01731 |
| 11+ years | -0.0291259 | 0.0184251 |
| Constant | 3.838689*** | 0.0340931 |
| R2 | 0.0385606 | |
| N | 22314 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | |

Note: Public services: Health, police, fire, refuse collection, schools, social care, public transport, street cleaning.

## 6.3 Summary

This Chapter undertook initial analysis of the local service outcomes in the SHS data. The analysis examined outcomes in the Frequency of Use, Convenience, and Satisfaction with Services as a function of individual and household variables. The regression models were applied on composite indicators formed of groups of services, providing indicators for the Frequency of use of Leisure Services, the Frequency of use of Necessities, Convenience of Essential Services, Satisfaction with Leisure Services, and Satisfaction with Public Services. Three outcome indicators were consistent over time: Frequency of use of Leisure Services, Convenience of Essential Services, and Satisfaction with Leisure Services.

The models showed that older age groups, those with disabilities, families, and private renters were less likely to find their local services convenient, although not all predictors remained significant in 2009-2011. Similarly, older age groups, households with children, the disabled, and social renters tended to be less likely to report Satisfaction with Leisure Services. While data on Satisfaction with Public Services was only available for 2009-2011, these showed higher levels of satisfaction among older age groups, and private and social renters. Some of these patterns are inversely reflected in the Frequency of use, as higher income groups, professional occupation groups, and owner-occupiers were more likely to be frequent users of Leisure Services and Necessities. The lower levels of Use and Satisfaction observed for low-income residents and social renters correspond to some previous research evidence (e.g. Bramley & Besemer, 2011; 2016; 2018; Clark & Kearns, 2017), while it was unexpected that social renters had higher than average satisfaction with Public Services. This may relate to higher rates of use or possibly lower expectations among this group, which previous studies have referred to (ibid.; Duffy, 2000).

This Chapter also compared models at both ends of the New Labour period for the consistent service indicators. The models for Frequency of use did not show

substantial differences between the two time periods. In turn, fewer household variables continued to predict variations in Convenience in the later period, which may indicate positive change in the access or availability of services. However, Satisfaction with Leisure Services remained lower than average for households with children, retired individuals, those with disabilities, and private and social renters. This concurs with previous studies that have found these groups to experience more constraints in using services (Bramley & Besemer, 2011; 2016; 2018).

Overall, the many significant relationships with individual and household predictors point to the importance of controlling for these factors in further modelling. Furthermore, the outcomes for different service users are likely to vary depending on the service, which will be addressed by running separate models for individual services in the next chapter.

# 7 Area-level analysis of local services

This Chapter builds on the previous models in Chapter 6 by introducing neighbourhood-level characteristics into the analysis through multilevel modelling. The analysis therefore addresses Research Questions 1 and 2, concerning the variations in local service outcomes in mixed areas and possible change in service outcomes over time. Multilevel models are used in order to examine the impact of the types of tenure mix and other area-level predictors on the outcomes, and the modelling strategy and model specifications are explained in the first sections (7.1, 7.2). The focus of the analysis is on the composite service outcome indices constructed in the previous chapter, complemented by separate models for the individual service items within each indicator. The analysis begins by modelling the outcomes at the data zone level in section 7.3, after which section 7.4 undertakes additional models to control for the impact of population density in models for the outcome indices. Similar modelling of the indices is conducted using the intermediate area level in section 7.5.

Within the data zone level analysis, two models are presented for each outcome. Building on the individual-level analysis in Chapter 6, initial models only add the area-level measure of deprivation in order to examine one of the hypotheses concerning social mix (‘*economic capital’*), according to which mixing increases economic demand for services through the introduction of middle-class households. The question is then whether living in an area with higher average incomes might improve service outcomes for all residents by raising purchasing power in an area. By measuring the relationship between service outcomes and area deprivation after controlling for individual income, we can identify whether there appears to be an effect of social mix through aggregate ‘economic capital’. We might expect therefore to see an impact particularly on private services. These income models are undertaken for each outcome in section 7.3 before turning to full models examining the additional impact of tenure mix. Including tenure mix alongside deprivation may capture any additional benefits of mixing, where we might expect relationships with public services to be stronger as these are more open to pressure through collective organisation. This modelling strategy therefore allows us to better

unravel potential mechanisms in the association of tenure mix with local services.

The Chapter addresses Research Question 2 by comparing outcomes for the consistent service indicators at both time periods, focussing on the impacts of tenure mix and deprivation. With regard to tenure mix, we might expect any benefits from living in mixed areas to have become greater in the later period, as the initiatives of New Labour endorsed social mix. Further, we are interested in seeing whether the outcome gap between more affluent and poorer areas narrowed, presenting as a reduction of the effect of deprivation, in line with the policy aim of the time.

## 7.1 Modelling strategy

This section undertakes multilevel modelling of the local service outcomes. The presentation of the models in 7.3 is based around the three outcomes, Frequency of Use, Convenience, and Satisfaction with Services. For each outcome, we first model the composite indicators for groups of services in order to observe the general pattern of results, after which separate models are run for each service in the outcome category. Both the composite and separate models are compared for the two time periods within each outcome where possible. The conclusions at the end of this chapter aim to summarise the substantial findings and assess the analysis undertaken. The research questions this chapter aims to answer are:

1. Are the access to and quality of local services perceived to be better in more mixed areas?
2. Did area differences in service access and quality reduce during the New Labour period?

To answer Research Question 1, the area-level analysis focuses first on the composite outcome indicators. As these are scales formed of multiple items, they can be treated as continuous and modelled by linear random intercept

models. It also examines the individual services. As these are measured using ordinal scales, they are modelled through cumulative logit models.

To explore a potential mechanism related to Research Question 1, initial models are run only adding the area-level effect of income through the Scottish Index of Multiple Deprivation (SIMD). This will allow us to distinguish whether individual income explains variations in service perceptions independently of area-level affluence or deprivation. In this way, we can examine whether an economic demand mechanism pertains to the outcomes and begin to understand whether improved levels of service provision in mixed areas might be explained by the average level of economic demand, after controlling for individual income or economic resources. After this, the full models are undertaken including the tenure mix clusters and further area variables.

To answer Research Question 2, we compare the service outcomes for the two time periods of the SHS, 1999-2002 and 2009-2011. The question relates to the difference in the extent to which both tenure mix and deprivation contribute to the outcomes. The inclusion of the SIMD in the models allows us to assess whether the policies and service reforms implemented by New Labour succeeded in narrowing the gap in service provision between deprived and non-deprived areas in this period.

As described in section 6.1, the early sample of the SHS comprises 60,850 respondents, and the later sample 48,094. The analysis focuses primarily on examining variations at the data zone level. Respondents in the first sample are nested within 4440 unique data zones, and in the later sample 6976 unique data zones. Furthermore, the data zones are used to link responses to the intermediate zone (IZ) geography for the purposes of the second set of models. The 1999-2002 data covers 1225 and the 2009-2011 data 1270 intermediate areas. Each sample has a few respondents with missing data zone identifiers, which marginally reduces the number of cases in the area-level analysis. The sample sizes also vary for each service outcome and by the addition of explanatory variables, each of which are missing for some cases.

The random part of the multilevel models includes the data zone or intermediate zone, and the fixed part the predictor variables. The individual predictor variables were specified in Chapter 6. The variables describing the tenure clusters (constructed in Chapter 5) are added into the fixed part. In addition to the coefficients, attention is paid to the estimated between-area variances from these models. To find out whether the inclusion of individual-level variables reduces the variation explained by tenure mix, initial models were run including only the tenure clusters as explanatory variables, and this is referred to in the model description.

The linear models are undertaken on the eight composite outcome indicators, the construction of which was explained in section 6.1.3. In the logistic models for individual service items, some small categories are collapsed to aid interpretation of the models, still allowing us to use ordered logistic regression due to the hierarchical ordering but with fewer cut-offs. The indicators for Frequency of Use are coded four-fold referring to the categories 'yesterday/within the last week'; 'within the last month/6 months'; 'within the last year'; and 'less than once a year or never'. The original 5-point scale is retained for Convenience of Services, as the categories were considered sufficiently large. The indicators for Satisfaction are coded into three groups: 'very/fairly dissatisfied', 'neither', and 'very/fairly satisfied' in order to provide larger sample sizes to the categories.

## 7.2 Model specifications

*Linear random intercept models*

The concept of multilevel modelling was introduced in Chapter 4. This chapter undertakes multilevel models on the composite indicators for service outcomes, which are measured on a continuous scale. This requires the use of linear multilevel models, which assume that the overall relationship between $y$ and $x$ is represented by a straight line with intercept $\beta_0$ and slope $\beta_1$. The random intercept model implies that the intercept for a given

data zone $j$ is $\beta_0 + u_j$, i.e., higher or lower than the overall intercept $\beta_0$ by an amount $u_j$. The $u_j$ is a group effect, or residual, which is assumed to follow a normal distribution with a mean of zero and variance $\sigma_u^2$. It represents the unobserved group-level influences on $y$, i.e., the part of the unobserved variance which people in the same neighbourhood share in common. The individual-level residuals, $e_{ij}$, are the difference between the individual's value on $y$ and the data zone mean. They are also assumed to be normally distributed. The equation then becomes:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + u_j + e_{ij}$$

The residuals are specified as:

$$u_j \sim N(0, \sigma_u^2) \text{ and } e_{ij} \sim N(0, \sigma_e^2)$$

The between-group variance $\sigma_u^2$ represents the departures of group means from the overall mean, while the individual-level variance $\sigma_e^2$ individual departures from the group means. As the variance is partitioned into these two components, the model is sometimes called a variance components model (Snijders & Bosker, 1999). Adding level-1 explanatory variables ($x_{ij}$) to the model will always reduce the level-1 variance and the total variance (sum of the level-1 and level-2 variances). However, the level-2 variance may stay the same, increase, or decrease depending on whether the distribution of $x_{ij}$ differs across level-2 units (Steele, 2008; Snijders & Bosker, 1999)

*Random intercept cumulative logit models*

A second set of multilevel models is undertaken for the individual service items. These are ordinal outcome variables, and in a non-hierarchical model, they could be modelled through ordered logistic regression. As this section undertakes a multilevel approach, the type of model to use is a cumulative logit model (Steele, 2011). A level-2 random effect for the area-level (data zone) is included as a random intercept. In the fixed part of the model will be included the explanatory variables, as with the linear model. The equation is:

$$\log\left(\frac{\Pr(y_{ij}\leq k)}{\Pr(y_{ij}>k)}\right) = \text{logit}(y_{kij}) = \alpha_k + \beta x_{ij} + u_j, \qquad k = 1, \ldots C - 1$$

for individual *i* in data zone *j,* and where $a_k$ are referred to as threshold parameters (analogous to the intercept in a binary response model) and *B* are the coefficients of *X*. We have a different intercept for each category *k,* except for the last one *C*. By adding the data zone-level residual $u_j$, we allow the intercepts to vary from group to group following a normal distribution, but we assume that, overall, these will follow a normal distribution:

$$u_j \sim N(0, \sigma_u^2)$$

The coefficient *B* is interpreted as the effect of a 1-unit change in *x* on the log-odds of being in a higher category of *y* rather than a lower category holding constant the group effect *u*. Similar to the linear regression coefficients, *B* > 0 implies that higher values of *x* are associated with higher values of *y*. We can predict the log odds of belonging to a specific category of the outcome from the cut-off points provided by the model. For example, for a 4-category outcome variable that gets a cut-off point of 1.7, the log odds of being in category 4 or higher is $u_j$ + 1.7. The random effect therefore allows the cumulative response probability to vary by area (Steele, 2011).

We also estimate the residual between-group variance in the log-odds that outcome *y* ≥ categories *k*. By adding area-level explanatory variables, such as the area type clusters and deprivation, we try to explain some of the variation between areas. These are added into the fixed part of each model. Moreover, the size of the area effects can be estimated by calculating the variance partition coefficient (VPC), which is the proportion of the total variance due to between-group differences. The level 1 residuals are assumed to follow a standard logistic distribution which has a variance of $\pi^2/3 \approx 3.29$ (Steele, 2011). For a between-area variance of 0.17, the VPC is 0.17/ (0.17+3.29) =0.049, meaning around 5 % of the variation is due to between-area variation.

## 7.3 Data zone-level analysis

The service outcomes are first modelled at the data zone level. The analysis focuses on the relationship between the outcomes and the tenure clusters constructed in Chapter 5, which have been joined to the SHS data. Figure 7.1 summarises the tenure cluster compositions for data zones in 2011, with the 2001 clustering being nearly identical. The clusters are included as dummies in the fixed part of the models. At each time, the majority-owner cluster, OO, is omitted as the reference category, as we are interested in examining the association of more mixed areas with the outcomes. Particularly, the cluster OO-PR (owners mixed with private rent) is of interest as the most evenly mixed cluster.

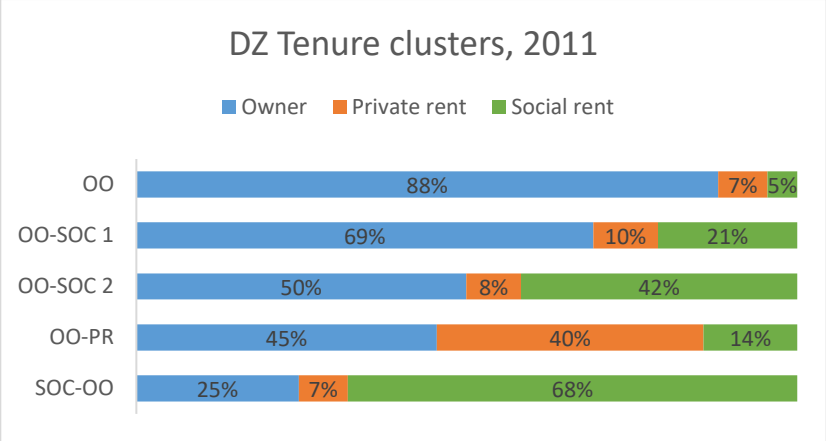


Figure 7.1 Composition of data zone tenure clusters 2011. Source: Census 2011.

*Clusters and service outcomes*

Before moving to the regression models, Figures 7.2 and 7.3 present the mean scores of each of the composite service outcome measure for the tenure clusters in 1999-2002 (three measures) and 2009-2011 (five measures), respectively. It should be noted that the scales used to measure the outcomes differ (see Chapter 6), so the mean values should not be compared between outcomes. In 1999-2002, the clusters OO and OO-PR have the highest average Frequency of Use of Leisure Services, while in 2009-2011 OO-PR has only slightly higher average Frequency of Use for Leisure and Public Services. In both samples, data zones in the OO-PR cluster have the highest mean for

Convenience, while the OO-SOC 2 and SOC-OO clusters come close to it. The descriptive graphs therefore provide some initial evidence that the most mixed data zones have higher average levels of Convenience and Satisfaction. Further, comparing the values for OO-SOC 2 and SOC-OO implies that greater mixing in areas with high levels of social rent does not contribute to large differences in outcomes.

The graphs allow us to observe differences between the time periods in the consistent indicators. The averages for Frequency of Use of Leisure Services are not comparable between 2009-2011 and 1999-2002 due to the difference in scales derived from the original response categories (Chapter 6). However, levels of Convenience are higher in the later data for nearly all clusters, albeit differences are very small. Satisfaction with Leisure Services is lower in the later period in the three owner-dominated clusters (OO, OO-SOC 1 and 2), and very slightly lower in SOC-OO. The comparison over time is particularly of interest in the case of the most deprived cluster, SOC-OO, as the neighbourhood initiatives of New Labour were targeted to more deprived areas with the highest concentrations of social housing. In the majority social rent areas (SOC-OO), the average level of Convenience is slightly higher in 2009-2011. This implies that access to services may have improved in social rent-dominated areas, albeit very slightly.

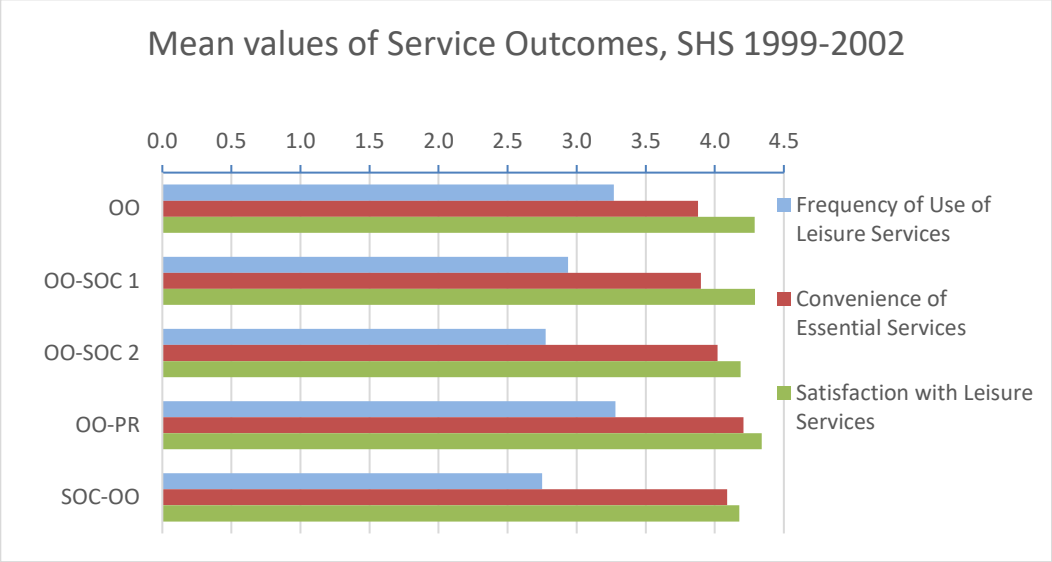


Figure 7.2 Mean values of service outcome indicators within tenure clusters.SHS 1999-2002. Note: scale refers to composite outcome indices.

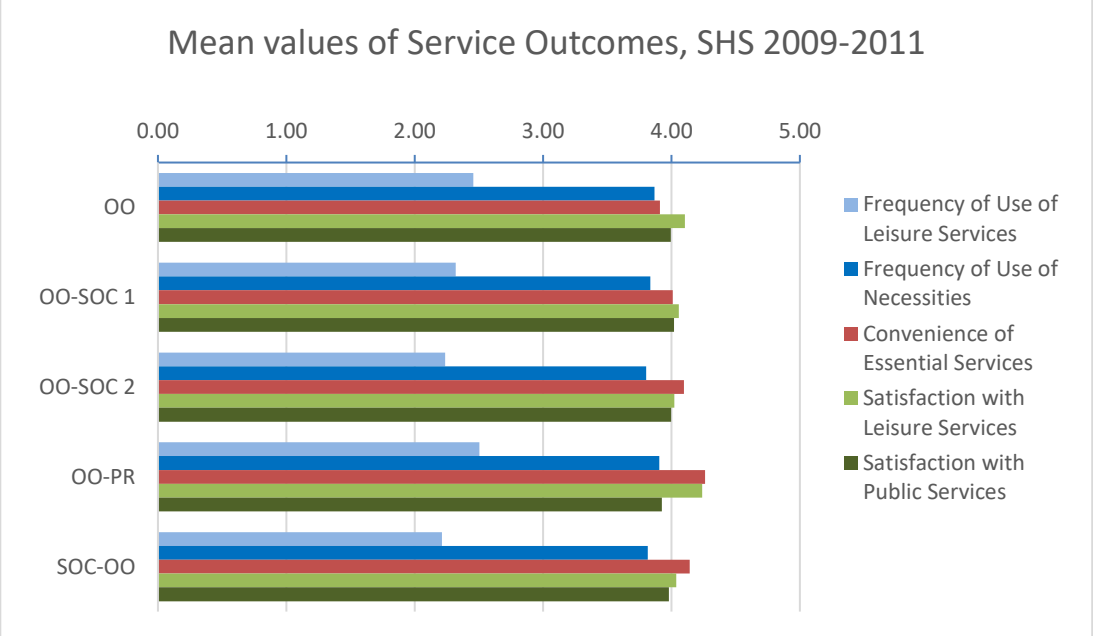


Figure 7.3 Mean values of service outcome indicators within tenure clusters. SHS 2009-2011. Note: scale refers to composite outcome indices.

## 7.3.1 **Frequency of Use**

The first outcome category is Frequency of Use of Services. The two time periods include slightly different services, and a consistent indicator for both periods was formed for Leisure Services (libraries, parks, museums, sports). The later sample also asked about the Frequency of Use of services named

Necessities (post offices, banks, cash machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, and public transport). The scales are based on original response categories which were slightly different for each outcome (as detailed in section 6.1.2), ranging from 1 ('never' for Leisure Services or 'less than once a year' for Necessities) to 6 ('most days' for Leisure Services in 2009-2011) or 7 ('more than once a week' for Necessities, or 'yesterday' for Leisure Services in 1999-2002).

*Income models*

The first set of models (Table 7.1) examines the relationship between area-level deprivation and individual income by including the SIMD categories as the only area-level predictors. The least deprived quintile (5) is used as the reference group. The inclusion of the SIMD does not diminish the coefficients for individual income in any of the models for Frequency of Use (Table 7.1). The highest income groups continue to be significantly more likely to be more frequent users of both Leisure Services and Necessities (the strongest coefficients appearing for the £20,000+ group in the Use of Leisure Services at both time periods and for the £15-20,000 group in the Use of Necessities). Individual income helps to explain variations in service use regardless of average area-level deprivation which is what we would expect: higher incomes mean resources to travel to use services and to pay any costs of use.

Over and above individual income, however, a clear and consistent pattern emerges for the SIMD quintiles, at least in relation to Leisure Services. Even after controlling for individual income, respondents from more deprived quintiles are significantly less likely to report frequent use of Leisure Services at both time periods (Tables 7.1, 7.2). As to the economic capital mechanism, this finding suggests that there could be benefits from higher average incomes to all residents in mixed areas. In comparison to Leisure Services, there is much less variation in Frequency of Use of Necessities by SIMD (Table 7.1). This is not surprising as these services are essential to most people on an everyday basis, and concurs with some evidence that deprived areas do not experience

significant constraints in all types of services (Bramley & Besemer, 2018; Bailey et al., 2017).

Looking at changes over time, the SIMD coefficients for Leisure Services in the later period are slightly weaker, which means that levels of deprivation explain slightly less variation compared to other predictors in the later period. This is particularly true for the first three (most deprived) quintiles. This is in line with the hypothesis that differences between affluent and less affluent areas narrowed during the New Labour period.

Table 7.1 Income model results for Frequency of Use of Leisure Services and Necessities.SHS 1999-2002, 2009-2011.

| | **Frequency of Use of Leisure Services, 1999-2002** | | **Frequency of Use of Leisure Services, 2009-2011** | | **Frequency of Use of Necessities, 2009-2011** | |
|---|---|---|---|---|---|---|
| | **b** | **se** | **b** | **se** | **b** | **se** |
| SIMD quintile 1 | -.348994*** | 0.0272456 | -.2613663*** | 0.0216196 | -.0389932* | 0.018891 |
| SIMD quintile 2 | -.3456115*** | 0.0259873 | -.210639*** | 0.0206252 | -.0452823* | 0.0179796 |
| SIMD quintile 3 | -.2848813*** | 0.0258036 | -.1797995*** | 0.0201704 | -.0524501** | 0.0174058 |
| SIMD quintile 4 | -.1497118*** | 0.0256182 | -.1515619*** | 0.0200181 | -0.0295603 | 0.0173597 |
| SIMD quintile 5 | | | | | | |
| <=25 | 0 | . | 0 | . | 0 | . |
| 26-35 | -.0875581** | 0.0281265 | 0.0206175 | 0.0290525 | 0.0358147 | 0.0261442 |
| 36-45 | -.2041377*** | 0.0286248 | -0.0205744 | 0.0288638 | -0.0404243 | 0.025956 |
| 46-55 | -.4367205*** | 0.0293778 | -.1489221*** | 0.0292037 | -0.0489325 | 0.0263821 |
| 56-65 | -.4703164*** | 0.0329806 | -.1769206*** | 0.0313379 | -0.0256378 | 0.0282582 |
| 65+ | -.7698234*** | 0.0428134 | -.3017212*** | 0.0363216 | -.1963199*** | 0.0327674 |
| Male | 0 | . | 0 | . | 0 | . |
| Female | .0775139*** | 0.0137672 | .0453685*** | 0.0108267 | -.0299988** | 0.0098235 |
| Single adult | 0 | . | 0 | . | 0 | . |
| Small/large adult | -.181506*** | 0.0231289 | -.0755072*** | 0.0179727 | -0.0130998 | 0.0162802 |
| With children | .2634995*** | 0.0235405 | .2805431*** | 0.0190825 | .1268002*** | 0.0171057 |
| Pensioners | -.1132037*** | 0.0324458 | 0.0205955 | 0.0229856 | 0.033077 | 0.0207317 |
| Employers and managers | 0 | . | 0 | . | 0 | . |
| Professional/Intermediate | .2285578*** | 0.0287554 | .1549089*** | 0.0254862 | .0496209* | 0.0230589 |
| Service/Supervisors | -.0692543* | 0.0275969 | -0.0203797 | 0.0249648 | 0.0246281 | 0.0225831 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Manual workers/routine | -.3104858*** | 0.0289649 | -.1526589*** | 0.0263714 | -.0955777*** | 0.0237129 |
| Looking after home | -.2492025*** | 0.0355879 | -.0954783** | 0.0321221 | -0.0019861 | 0.0292561 |
| Retired | -.1874765*** | 0.0359669 | -.0840107** | 0.0289454 | -.0695315** | 0.0260976 |
| Jobseeker | -.2891418*** | 0.0543258 | -0.0554404 | 0.0380346 | -.1096461** | 0.034379 |
| Disabled | -.5370154*** | 0.0393187 | -.2268574*** | 0.0315695 | -0.0210935 | 0.0288918 |
| £0-6000 | 0 | . | 0 | . | 0 | . |
| £6000-10000 | 0.0176843 | 0.0217446 | 0.0088791 | 0.0249527 | 0.0200711 | 0.0231837 |
| £10-15000 | .0503091* | 0.0229215 | .0508538* | 0.0241216 | .0944291*** | 0.0223132 |
| £15-20000 | .0593436* | 0.0262023 | .0730204** | 0.0253591 | .1037176*** | 0.023336 |
| £20000+ | .1794041*** | 0.0264963 | .0949323*** | 0.0245761 | .0865356*** | 0.0225845 |
| Owner | 0 | . | 0 | . | 0 | . |
| Private rent | -.0727842* | 0.0322975 | -.0977205*** | 0.0210292 | -0.0155976 | 0.0189737 |
| Social rent | -.2849218*** | 0.0172544 | -.1651966*** | 0.0144883 | -.0815373*** | 0.0132059 |
| <1 year | 0 | . | 0 | . | 0 | . |
| <=10 years | 0.0047115 | 0.0252089 | .043573* | 0.0220327 | 0.023965 | 0.0200742 |
| 11+ years | -.0752181** | 0.02706 | -0.0303599 | 0.0235136 | -.0487586* | 0.0214676 |
| Constant | 3.762085*** | 0.0482278 | 2.591449*** | 0.0453778 | 3.92054*** | 0.0406773 |
| Level 2 variance | -1.206524*** | 0.0327475 | -1.22575*** | 0.0248697 | -1.496646*** | 0.0320395 |
| Level 1 variance | -.0117051* | 0.0048243 | -.3351485*** | 0.0053701 | -.4145559*** | 0.0053526 |
| BIC | 73974.41 | | 51444.8 | | 47388.18 | |
| N | 25535 | | 22325 | | 22425 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

*Tenure mix models*

To illustrate the amount of variance explained by the tenure clusters, an initial model for the composite indicator for Frequency of Use of Leisure Services in 1999-2002 is run including only the tenure mix clusters as explanatory variables. This model (omitted) has 9% of its variance explained by between-area differences, the amount reducing to 4.8% when further explanatory variables are added, indicating that the area level accounts for little variation in Frequency of Use.

Turning to the full model for Frequency of Use of Leisure Services in 1999-2002 (Table 7.2), the inclusion of the tenure mix measures does not substantially alter the coefficients from the previous models in Table 7.1. Overall, the tenure mix clusters account for little variation in Frequency of Use. As the largest coefficients of the clusters, the majority social rent (SOC-OO) cluster has a positive coefficient of $b$=0.13 ($p$<0.001) which implies that residents in these areas are slightly more likely to report higher frequency of use compared to those in other areas. This is somewhat contradictory to the coefficient for social renters which remains negative. This may imply that, while social renters report using Leisure Services less frequently wherever they live, all residents in the SOC-OO cluster use these services more than those in the least-mixed OO cluster.

However, in the 2009-2011 model for Frequency of Use of Leisure Services, the pattern for the tenure clusters is slightly different. The SOC-OO cluster does not hold a significant coefficient, whereas the most evenly mixed cluster OO-PR accounts for small positive variation in the Frequency of Use of Leisure Services ($b$=0.1, $p$<0.001, Table 7.2). Respondents in areas that have the most even proportions of owners and private renters therefore are more likely to report frequent use.

In the initial model for Frequency of Use of Necessities in 2009-2011 (omitted), the variance explained by the area-level is lower than for Leisure Services, at 5.6%, compared to 9%. It is plausible that area accounts for less variation in Necessities because these types of services are more evenly distributed, compared to the greater amount of variation in the use of Leisure Services across areas, as Leisure includes for example sports facilities and cultural venues. Furthermore, the tenure clusters do not explain variations in the use of Necessities in a significant manner, which could be expected due to the nature of these services

Throughout the models for Frequency of Use, small towns and rural areas are consistently more likely to report less frequent use of Leisure Services, while for Necessities, only small significant coefficients are found for remote small towns and rural areas (Tables 7.1, 7.2). This could be expected as issues of access and availability are prevalent for both types of services in more remote areas.

Table 7.2 Model results for Frequency of Use of Leisure Services and Necessities. SHS 1999-2002.

| | **Frequency of Use of Leisure Services, 1999-2002** | | **Frequency of Use of Leisure Services , 2009-2011** | | **Frequency of Use of Necessities, 2009-2011** | |
|---|---|---|---|---|---|---|
| | **b** | **se** | **b** | **se** | **b** | **se** |
| OO | 0 | . | 0 | . | 0 | . |
| OO-SOC 1 | -0.0114387 | 0.0246556 | -0.00391 | 0.019096 | 0.018758 | 0.016571 |
| OO-SOC 2 | 0.0147479 | 0.0312327 | -0.02484 | 0.024652 | -0.00567 | 0.021457 |
| OO-PR | 0.0485747 | 0.0418965 | .0985396*** | 0.028406 | -0.00469 | 0.029684 |
| SOC-OO | .128978*** | 0.0360477 | 0.007747 | 0.033744 | 0.015508 | 0.025011 |
| SIMD quintile 1 | -.3990271*** | 0.0381952 | -.2618526*** | 0.03032 | -0.04564 | 0.026584 |
| SIMD quintile 2 | -.3563506*** | 0.0323671 | -.1903837*** | 0.025179 | -.044295* | 0.021995 |
| SIMD quintile 3 | -.2492549*** | 0.0297368 | -.1446246*** | 0.023034 | -.0482224* | 0.020044 |
| SIMD quintile 4 | -.10512*** | 0.0270025 | -.1062417*** | 0.020672 | -0.02339 | 0.018056 |
| SIMD quintile 5 | 0 | . | 0 | . | 0 | . |
| Urban | 0 | . | 0 | . | 0 | . |
| Small towns | -.0907907*** | 0.027506 | -0.03651 | 0.022382 | 0.017867 | 0.019373 |
| Remote small | -.1514278*** | 0.0407691 | -0.04781 | 0.029436 | -.0562088* | 0.024716 |
| Rural | -.1822187*** | 0.0218803 | -.152248*** | 0.01724 | -.0676274*** | 0.014872 |
| <=25 | 0 | . | 0 | . | 0 | . |
| 26-35 | -.0827238** | 0.0280972 | 0.028465 | 0.02991 | 0.031354 | 0.027095 |
| 36-45 | -.1945825*** | 0.0286091 | -0.00099 | 0.029773 | -0.03359 | 0.026904 |
| 46-55 | -.420588*** | 0.0293898 | -.132929*** | 0.030187 | -0.04139 | 0.027394 |
| 56-65 | -.4520332*** | 0.0329942 | -.1539561*** | 0.032401 | -0.01443 | 0.029362 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 65+ | -.751802*** | 0.0427947 | -.280228*** | 0.037492 | -.1859385*** | 0.034018 |
| Male | 0 | . | 0 | . | 0 | . |
| Female | .0761813*** | 0.0137527 | .0474066*** | 0.011152 | -.0316162** | 0.010157 |
| Single adult | 0 | . | 0 | . | 0 | . |
| Small/large adult | -.1683392*** | 0.0231641 | -.0764274*** | 0.018506 | -0.02521 | 0.01685 |
| With children | .2834798*** | 0.0236677 | .2852726*** | 0.019711 | .1225626*** | 0.017787 |
| Pensioners | -.102545** | 0.0324403 | 0.015989 | 0.023586 | 0.023285 | 0.021396 |
| Employers and managers | 0 | . | 0 | . | 0 | . |
| Professional/Intermediate | .221555*** | 0.0287225 | .1544321*** | 0.026285 | 0.042418 | 0.023927 |
| Service/Supervisors | -.0696574* | 0.0275641 | -0.02334 | 0.025714 | 0.020717 | 0.023422 |
| Manual workers/routine | -.3053713*** | 0.0289432 | -.1442794*** | 0.027191 | -.0911851*** | 0.024606 |
| Looking after home | -.2447359*** | 0.0355478 | -.0895835** | 0.033084 | -0.00186 | 0.030215 |
| Retired | -.1923278*** | 0.0359355 | -.0774776** | 0.029814 | -.0722596** | 0.027031 |
| Jobseeker | -.2856302*** | 0.0542613 | -0.05546 | 0.03908 | -.114968** | 0.035532 |
| Disabled | -.5378597*** | 0.0392786 | -.2242899*** | 0.032487 | -0.02561 | 0.029882 |
| £0-6000 | 0 | . | 0 | . | 0 | . |
| £6000-10000 | 0.014518 | 0.0217221 | 0.016276 | 0.025656 | 0.016023 | 0.023917 |
| £10-15000 | .0474132* | 0.0228958 | .0601737* | 0.024816 | .0861332*** | 0.023029 |
| £15-20000 | .0586771* | 0.0261746 | .0819921** | 0.026061 | .1020473*** | 0.024101 |
| £20000+ | .1779432*** | 0.0264728 | .1113529*** | 0.025316 | .0819089*** | 0.02334 |
| Owner | 0 | . | 0 | . | 0 | . |
| Private rent | -.080033* | 0.0326605 | -.1015025*** | 0.021867 | -0.02218 | 0.019838 |
| Social rent | -.2874014*** | 0.0174906 | -.1647213*** | 0.015062 | -.0818331*** | 0.013829 |

| | | | | | | |
|---|---|---|---|---|---|---|
| <1 year | 0 | . | 0 | . | 0 | . |
| <=10 years | 0.0089627 | 0.0251799 | .0518079* | 0.022659 | 0.015876 | 0.020727 |
| 11+ years | -.0683776* | 0.0270364 | -0.02339 | 0.024174 | -.0547585* | 0.02215 |
| Constant | 3.767353*** | 0.0487941 | 2.567367*** | 0.046821 | 3.944823*** | 0.04223 |
| Level 2 variance | -1.252279*** | 0.0348811 | -1.503834*** | 0.038106 | -1.836149*** | 0.057087 |
| Level 1 variance | -.0113227* | 0.0048248 | -.3044033*** | 0.005503 | -.3826264*** | 0.005495 |
| BIC | 73934.2 | | 49005.54 | | 45245.79 | |
| N | 25534 | | 21103 | | 21155 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

*Individual service items*

Modelling the composite scale variables, as shown above, provides a general view of the outcomes, but it is further important to model the included services separately in order to get a more detailed picture. This will help us to determine which services contribute to the relationships observed through the composite indicators and whether some services differ from these. As the service items are ordered categorical variables, random intercept cumulative logit models are used. Positive values of the coefficients indicate increased likelihood of being in the higher categories of the outcome, such as more frequent use of a service.

Table 7.3 contains models for the services that formed the consistent indicator for the Frequency of use of Leisure Services. The 1999-2002 data included an additional item, swimming facilities, which is included here. Overall, results show that, for tenure mix, the relationships with outcomes for individual services can vary quite a bit from that shown for the composite indicators. The relationships with area deprivation, on the other hand, are much more stable. The mixed tenure clusters OO-PR and SOC-OO yield positive coefficients for the Frequency of Use of parks and museums, implying more frequent use in these areas, while SOC-OO has a negative coefficient for sports. However, despite the two positive coefficients for SOC-OO, social renters are less likely to frequently use all services, which was seen in the composite model.

The 2009-2011 data further included theatres/concert halls and community centres (Table 7.4). The OO-PR cluster yields positive coefficients for the Frequency of Use of parks, museums, and theatres/concert halls, whereas a negative coefficient for community centres. The use of cultural facilities and disuse of community centres may have to do with preferences, and suggests that these areas have higher levels of cultural and economic capital, as previous research has shown higher-resource groups to use cultural and leisure facilities more (e.g., Bramley & Besemer, 2018; Duffy, 2000; Clark & Kearns,

2017). In turn, libraries, museums, and theatres/concert halls have lower probabilities of frequent use for the two owner-dominated clusters (OO-SOC 1 and OO-SOC 2). This is likely to reflect issues with access, as the owner-dominated areas are more likely to have longer distances to cultural facilities. It is also interesting to note the change in the coefficient for libraries between the two time periods, which may reflect the increase of library branch closures during this time[13].

In the later period, Frequency was also measured for Necessities, which had a less clear pattern for the tenure clusters (Table 7.5). However, some patterns stand out when looking at the individual services. Public transport, post offices, cash machines and food shops are likely to have higher levels of frequency of use in the OO-PR cluster, while petrol stations and outpatients are less likely to be used frequently in these areas. The difference between these services seems to point to the importance of location. Inner city areas are better served by public transport, and have more post offices, cash machines, and food shops, whereas proximity to services and access to public transport will discourage the use of petrol. Meanwhile, less frequent use of outpatients may reflect a healthier population composition of residents.

*Summary: Frequency of Use*

In summary, the indicators for Frequency of Use of Leisure Services and Necessities do not show a consistent pattern with different types of tenure mix. Instead, Use continued to be associated with household characteristics such as age and income, and with area income or deprivation. Modelling the service items separately reveals different patterns along the area and household predictors. As expected, there is a lot of variation in how frequently different services are used, but two groups of services perhaps stand out.

[13] www.gov.scot/Topics/Statistics/Browse/Tourism-Culture-Sports/TrendPublicLibraries

http://www.fsb.org.uk/media-centre/press-releases/bank-branches-closing-faster-in-scotland [Accessed 27/02/2019]

Cultural facilities appear to be more frequently used by residents in more mixed areas compared to owner-dominated areas. The mixed areas OO-PR and SOC-OO seemed to also differ from the other clusters in the use of Necessities. These patterns are likely related to location, as mixed areas are more often better positioned for cultural facilities and most everyday amenities compared to areas in the default OO cluster. Secondly, the pattern for the use of cultural facilities is likely to reflect preferences of residents in mixed areas. This could imply a selection effect, so that people who wish to attend cultural events tend to sort into areas within a closer reach of cultural facilities.

Table 7.3 Logit models for individual service items, Frequency of Use of Leisure Services. SHS 1999-2002.

| **Frequency of Use of Leisure Services, 1999-2002** | **Libraries** | **Parks** | **Museums** | **Swimming** | **Sports** |
|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | 0.0196679 | 0.055381 | -0.0177711 | -0.0218513 | -.1442915** |
| OO-SOC 2 | 0.0386214 | .1972175** | -0.0613527 | 0.0277761 | -0.0306998 |
| OO-PR | 0.0856997 | .2555268** | .3522761*** | 0.024922 | -0.0888894 |
| SOC-OO | 0.0309231 | .3743635*** | .7463803*** | -0.0519757 | -.1989874** |
| SIMD quintile 1 | -.4983058*** | -.8422971*** | -.7306135*** | -.3229124*** | -.3775807*** |
| SIMD quintile 2 | -.3325523*** | -.6490276*** | -.7336631*** | -.2888034*** | -.3335915*** |
| SIMD quintile 3 | -.175427*** | -.4062647*** | -.4380655*** | -.2355843*** | -.2961288*** |
| SIMD quintile 4 | -0.071328 | -.1662441** | -.2543262*** | -0.060233 | -.1433231** |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 |
| Small towns | 0.0164216 | 0.0046326 | -.37069*** | -0.0603631 | -.1271532* |
| Remote small | 0.0816807 | -.2683965** | -.1819012* | -0.0655302 | -0.0801694 |
| Rural | -0.0674071 | -.3191674*** | -.1152219* | -.1104761** | -.1730496*** |
| <=25 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | 0.0607126 | -0.0910115 | 0.038754 | -.1027691* | -.3257148*** |
| 36-45 | .2966605*** | -.3305717*** | .1849205** | -.4095783*** | -.7207945*** |
| 46-55 | .2566303*** | -.4114401*** | 0.0983588 | -.9118804*** | -1.385855*** |
| 56-65 | .3284165*** | -.3972717*** | 0.0739006 | -1.016739*** | -1.652605*** |
| 65+ | 0.0238311 | -1.010213*** | -.336468*** | -1.879357*** | -2.182705*** |

| | | | | | |
|---|---|---|---|---|---|
| Male | 0 | 0 | 0 | 0 | 0 |
| Female | .2564583*** | -.1893329*** | .1096487*** | .3367586*** | 0.0039513 |
| Single adult | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -.1553881*** | -0.0704263 | -.3471157*** | -.260692*** | -.2750082*** |
| With children | .2524655*** | .4528627*** | -.1217661* | .7865983*** | .1515824** |
| Pensioners | -0.0400216 | -0.1190026 | -.1658639* | -0.1488977 | -.2163831** |
| Employers and managers | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | .4306245*** | .192344*** | .2822168*** | .1348153* | 0.0939156 |
| Service/Supervisors | .1744369*** | -0.0439152 | -.2981852*** | -0.0843584 | -.1262769* |
| Manual workers/routine | -.1260188* | -.1617184** | -.7193322*** | -.3256146*** | -.3891778*** |
| Looking after home | 0.0904207 | -0.0829526 | -.4002412*** | -.4194525*** | -.5568045*** |
| Retired | .2484837*** | -.2926368*** | -.4664532*** | -.4950395*** | -.510496*** |
| Jobseeker | 0.201934 | -.2469776* | -.5502533*** | -.4642667*** | -.52707*** |
| Disabled | -.2283399** | -.784063*** | -1.085817*** | -.8504459*** | -1.133367*** |
| £0-6000 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | -0.0516689 | 0.0014285 | .1103408* | 0.0209821 | 0.067017 |
| £10-15000 | -0.0661922 | -0.0309303 | .1366776* | 0.0752764 | .2011185*** |
| £15-20000 | -0.0659938 | -0.0052011 | .2146832*** | .1539777* | .1646729* |
| £20000+ | -0.0537617 | 0.019226 | .3828108*** | .2391827*** | .4084523*** |
| Owner | 0 | 0 | 0 | 0 | 0 |
| Private rent | 0.1147568 | -.1958053** | -0.053091 | -.1446544* | -0.0952661 |
| Social rent | -.3020875*** | -.34313*** | -.5663683*** | -.4273846*** | -.4850177*** |
| <1 year | 0 | 0 | 0 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| <=10 years | 0.0116885 | -0.0537918 | -0.0289978 | 0.0746455 | 0.0655565 |
| 11+ years | -.1328148* | -.1616499** | -0.0603844 | -0.0567709 | -0.0144311 |
| Cut1 | .2995647** | -2.047926*** | -0.0339637 | -.2823907** | -.9495817*** |
| Cut 2 | 1.061241*** | -1.134367*** | 1.553422*** | .7995421*** | -0.1378153 |
| Cut 3 | 1.926076*** | -.343684*** | 2.823836*** | 1.662294*** | .5286465*** |
| Constant | .110693*** | .3934249*** | .2925834*** | .0607561*** | .1667421*** |
| BIC | 58957.41 | 62830.51 | 41557.68 | 46008.77 | 44322.85 |
| N | 25308 | 25081 | 25073 | 25166 | 25047 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | |

Table 7.4 Logit models for individual service items, Frequency of Use of Leisure Services. SHS 2009-2011.

| **Frequency of Use of Leisure Services, 2009-2011** | **Libraries** | **Parks** | **Museums** | **Theatres/concert halls** | **Sports** | **Community centres** |
|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | -.1018931* | 0.0890999 | -.1512762* | -.1190438* | -0.0068413 | 0.0554384 |
| OO-SOC 2 | -.1779528** | .1515885* | -.184114* | -0.1098413 | -0.0119697 | 0.0277251 |
| OO-PR | 0.0880979 | .2869608*** | .9599177*** | .5400781*** | -0.1215274 | -.2095685* |
| SOC-OO | -0.087408 | 0.168983 | 0.0515425 | -0.0418177 | -0.011381 | 0.0047537 |
| SIMD quintile 1 | -.3412597*** | -.7941946*** | -.4261185*** | -.6585195*** | -.2746458*** | -0.0495466 |
| SIMD quintile 2 | -.1600224* | -.5618658*** | -.4182153*** | -.6109666*** | -0.106286 | 0.0567445 |
| SIMD quintile 3 | -.1267525* | -.3789016*** | -.3300656*** | -.4495895*** | -0.0765144 | 0.067134 |
| SIMD quintile 4 | -0.062823 | -.2637172*** | -.2804193*** | -.28674*** | -0.0848481 | .1446134* |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | 0.0247851 | -0.0431194 | -.5073337*** | -.3817245*** | -.173882** | .370014*** |
| Remote small | .1658028* | -0.0583476 | -.2294776* | -.339329*** | 0.0431678 | .4314684*** |
| Rural | -.1746068*** | -.494374*** | -.3882931*** | -.3517156*** | -.2164442*** | .5127944*** |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | .2440813** | 0.0091225 | 0.1798022 | -0.1402166 | -0.1073206 | .2466297* |
| 36-45 | .3519768*** | -.2369188** | .2385199* | -0.0947125 | -.2301922** | 0.1101305 |
| 46-55 | 0.1164687 | -.3483719*** | 0.0751285 | -0.1735082 | -.7210634*** | -0.0694106 |
| 56-65 | .3939595*** | -.4323731*** | 0.1086521 | -.21151* | -.9840955*** | -0.1090261 |
| 65+ | .2156333* | -.9504781*** | -0.1522807 | -.3473591** | -1.373265*** | -0.1026047 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Male | 0 | 0 | 0 | 0 | 0 | 0 |
| Female | .1081891*** | -.0573414* | .0822925* | .3693784*** | -0.0175818 | .199994*** |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -.2513391*** | 0.0168351 | -.2519666*** | -.1618364** | -0.0465427 | -0.0909873 |
| With children | .4165589*** | .7164456*** | 0.0774908 | -.1480163* | .6567589*** | .6870203*** |
| Pensioners | 0.00996 | .1281398* | 0.0777023 | 0.0026466 | -0.1110789 | 0.0877872 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | .423944*** | .1411205* | .2345041** | .1691264* | 0.1141109 | .3247973*** |
| Service/Supervisors | .1580956* | -0.0652622 | -.2008493** | -.1833202* | -0.0304745 | 0.0236792 |
| Manual workers/routine | -0.0536582 | -.1916959** | -.5648956*** | -.5535258*** | -.2349988*** | -0.0752206 |
| Looking after home | .282821** | 0.0858905 | -.2504946* | -.4598958*** | -.4084742*** | -0.1319063 |
| Retired | .2492739** | -.2767358*** | -.2503765** | -.4350147*** | -.3968456*** | -0.0383829 |
| Jobseeker | .4631242*** | 0.0362198 | -.4028526** | -.6028645*** | -.3173899** | -0.0240447 |
| Disabled | 0.0111335 | -.5295629*** | -.542482*** | -.8583808*** | -.5985961*** | -0.038641 |
| £0-6000 | 0 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | 0.0324789 | 0.0515427 | -0.1089753 | 0.0483541 | 0.1192959 | 0.0850343 |
| £10-15000 | 0.0205934 | 0.0698763 | -0.0485285 | .1936681* | .2643162** | 0.1445491 |
| £15-20000 | -0.0536614 | 0.0706717 | 0.0474955 | .3680513*** | .2572533** | .1875961* |
| £20000+ | -0.119881 | .1876218** | .1866478* | .5045092*** | .423457*** | .276196** |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | 0.1124622 | -.1204707* | -0.0494792 | -.3030862*** | -.2731067*** | -0.1283234 |
| Social rent | -.2055433*** | -.2343477*** | -.5759701*** | -.5551716*** | -.4253646*** | -.1609978** |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| <=10 years | 0.0039106 | -0.0654514 | 0.0650972 | .3118119*** | 0.1039298 | 0.0584271 |
| 11+ years | -.1796522** | -.25181*** | -0.0867118 | .1941105* | -0.0326706 | -0.0249941 |
| Cut1 | .6902872*** | -1.556782*** | .4870362** | .2908166* | 0.0170067 | 2.078325*** |
| Cut 2 | 1.226416*** | -.9389193*** | 2.295778*** | 2.370188*** | .4637725*** | 2.672901*** |
| Cut 3 | 2.577812*** | 0.0727908 | 4.618549*** | 5.138354*** | 1.133347*** | 3.327242*** |
| Constant | .1214125*** | .2958324*** | .6116989*** | .4009611*** | .0570068* | .3118448*** |
| BIC | 44122.13 | 52221.07 | 30845.05 | 32666.32 | 36853.16 | 31406.64 |
| N | 21070 | 21037 | 20998 | 21022 | 21065 | 20890 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

Table 7.5 Logit models for individual service items, Frequency of Use of Necessities. SHS 2009-2011.

| Frequency of Use of Necessities, 2009-2011 | Post offices | Banks | Cash machines | Doctors | Dentists | Outpatients | Grocery/food shops | Chemists | Petrol stations | Public transport |
|---|---|---|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | .0919439* | 0.0185 | 0.0802342 | 0.0154813 | -0.0037858 | -0.0858801 | .1386192* | .1050562* | -0.07289 | 0.0812611 |
| OO-SOC 2 | 0.048434 | -0.0481565 | 0.1208948 | -0.0566811 | -0.0424528 | -.1365586* | 0.1585454 | .1640294** | -.176662** | 0.114114 |
| OO-PR | .1478817* | -0.0547893 | .2166818** | -0.0262479 | -0.156907 | -.2100059** | .3117121** | 0.094301 | -.8240054*** | .5031097*** |
| SOC-OO | 0.104008 | -.2273408** | 0.0342028 | 0.0281191 | -0.0135036 | -0.1386203 | 0.215326 | 0.1139689 | -.3172254*** | .1883824* |
| SIMD quintile 1 | 0.0697833 | -0.0760289 | -0.1448255 | .1704664* | -.4904532*** | .2963488*** | -0.0538588 | -0.0845291 | -.3090717*** | -0.0446899 |
| SIMD quintile 2 | -0.0109959 | -0.0682366 | -0.0217269 | .1779828** | -.4370868*** | .2425908*** | -0.1190209 | -.1200126* | -0.0149899 | -.1667698* |
| SIMD quintile 3 | 0.0210134 | -0.0539609 | -0.120383 | 0.074465 | -.2765784*** | .1935422*** | -0.0952468 | -0.0437529 | 0.0805351 | -.3081641*** |
| SIMD quintile 4 | -0.0035738 | -0.0448459 | 0.0149121 | 0.0608893 | -0.106139 | .1883149*** | -0.0044772 | -0.007115 | 0.0096128 | -.1841511*** |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | .2645201*** | 0.0216913 | 0.0113627 | 0.0696443 | -0.0205329 | -.1275507* | .1741313* | .1782013*** | .2737624*** | -.4654062*** |
| Remote small | .4678535*** | .28233*** | -0.0788897 | -0.027316 | -.3681455*** | -0.0356572 | 0.1155058 | .397199*** | 0.0686165 | -1.170056*** |
| Rural | .6537592*** | 0.0435599 | -.4451742*** | 0.0573646 | -.2129706*** | -.1332578** | 0.1115492 | -0.0470307 | .5478273*** | -1.187066*** |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | .3261793*** | -0.0858993 | -.2774096** | 0.1149981 | 0.0919702 | .1729833* | -.3520759** | .2145905** | .5224217*** | -.276338*** |
| 36-45 | .2899807*** | -.2210946** | -.4972575*** | -0.1500269 | 0.171708 | 0.0372271 | -.500273*** | .1494989* | .4759402*** | -.2787901*** |
| 46-55 | .4201388*** | -.2324664** | -.6576193*** | -0.0414918 | 0.1674858 | .1804154* | -.5566237*** | .2099309** | .3979556*** | -.3558243*** |
| 56-65 | .5549035*** | -.2055421* | -.8193761*** | .1804217* | -0.1456953 | .3739057*** | -.6259396*** | .5384519*** | .3044877*** | -.2939205*** |
| 65+ | .5898278*** | -.1956093* | -1.579275*** | .1919688* | -.7443635*** | .5267755*** | -.8428625*** | .5062811*** | -0.0742075 | -.3483869*** |
| Male | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Female | .0583099* | 0.0059355 | -.1608714*** | .0620169* | .079392* | -0.0405043 | -.2139528*** | .1405168*** | -.3860007*** | .1587739*** |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | 0.0133255 | 0.0166683 | -0.0212038 | -0.0059175 | 0.0578583 | -0.0382302 | -.2570938*** | -0.0170936 | .178369*** | -0.0765746 |
| With children | .1733202*** | .1257631** | .2144584*** | .4233472*** | .364238*** | .3663216*** | .1593387* | .3717626*** | .3883863*** | -.1536794** |
| Pensioners | .1444303* | -0.0441436 | -0.0879022 | 0.0457704 | -0.0630586 | 0.0465508 | -.1708885* | 0.1130071 | 0.0180396 | .2263677*** |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | 0.0603761 | -.2299539*** | 0.1419276 | 0.1138438 | 0.0094691 | 0.052741 | 0.0508555 | .2040434** | -.210827** | .2390366*** |
| Service/Supervisors | -0.0170042 | 0.0791464 | 0.0222162 | .1352501* | 0.0172048 | -0.0013631 | 0.1105693 | .1736674** | -.2097696** | 0.0505112 |
| Manual workers/routine | -.2322812*** | -.2153054** | 0.0202073 | 0.0030998 | -.3353739*** | -0.0269419 | 0.0721201 | -0.0178099 | -.2621246*** | -0.0982939 |
| Looking after home | 0.1163325 | -.4882455*** | -.5554252*** | .845253*** | 0.1473983 | .4355538*** | 0.0378576 | .6899313*** | -.7620976*** | .1741077* |
| Retired | 0.0641393 | -.3761239*** | -.4592485*** | .7420675*** | -.2194217* | .4690524*** | -0.1231231 | .3428776*** | -.6914354*** | 0.0581454 |
| Jobseeker | 0.0770165 | -.6394837*** | -.7221515*** | .4088219*** | -0.0799001 | 0.1029242 | -0.0337997 | .3204136** | -1.439591*** | .5433009*** |
| Disabled | -0.0525686 | -.6353896*** | -.9058369*** | 1.880046*** | -0.1754033 | 1.324508*** | -.2540048* | 1.144135*** | -1.172384*** | -0.0663258 |
| £0 - £6000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| £6001 -£10000 | 0.057587 | -0.1141654 | 0.0752593 | -0.0655663 | -0.038287 | -0.1036752 | 0.0842324 | -0.0066208 | -0.1342017 | .1411702* |
| £10001 - £15000 | 0.0833978 | 0.0110556 | .2684087*** | 0.1179713 | 0.0616505 | 0.0276459 | 0.0219556 | .1786056** | 0.1216291 | 0.0618329 |
| £15001 - £20000 | -0.0032232 | 0.0644009 | .3936404*** | 0.0776394 | .2371188** | 0.1400762 | -0.078381 | 0.1030201 | .4329213*** | -.1529329* |
| £20001+ | 0.0026024 | 0.0473075 | .4979084*** | -0.0739073 | .2475498** | 0.0632002 | -.1997388* | 0.0640024 | .6679738*** | -.362571*** |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | .2534763*** | -0.031318 | 0.0308566 | 0.0627276 | -.6315541*** | 0.0063589 | .1706183* | -0.0472482 | -.4943416*** | .1571543** |
| Social rent | .3330008*** | -.3743214*** | -.3302335*** | .2651315*** | -.6149561*** | .1738438*** | 0.0426881 | .1101177** | -.9431945*** | .2872796*** |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| <=10 years | 0.0891897 | 0.0513485 | -0.0308049 | 0.0370902 | .2263669** | 0.0913266 | -0.093679 | -0.0436811 | .1679866** | -0.0726946 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 11+ years | 0.1098275 | 0.0176167 | -.2461079** | -0.0816303 | .1656818* | 0.0093124 | -.1916682* | -0.101183 | 0.0166854 | -0.1230341 |
| Cut1 | -1.505644*** | -2.447579*** | -3.173556*** | -1.079209*** | -1.701039*** | 1.052734*** | -3.948133*** | -1.532034*** | -1.106063*** | -1.797652*** |
| Cut 2 | .255378* | -1.056941*** | -2.849226*** | 1.727721*** | 3.633512*** | 3.453029*** | -3.515432*** | .2725489* | -1.013529*** | -.9586818*** |
| Cut 3 | 2.008725*** | .905192*** | -1.780926*** | 4.78121*** | 5.611458*** | 5.509725*** | -2.510222*** | 3.211764*** | .6510452*** | 0.0049176 |
| Constant | .1407792*** | .1773118*** | .1729406*** | .0745187*** | .2154509*** | .137058*** | .3705493*** | .1434618*** | .1397663*** | .3670296*** |
| BIC | 52887.19 | 53618.84 | 38654.37 | 42585.96 | 26368.27 | 37290.74 | 27890.78 | 46703.79 | 39825.88 | 52280.81 |
| N | 21023 | 20700 | 20708 | 20866 | 20622 | 20499 | 20988 | 20895 | 19394 | 20552 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | | | |

### 7.3.2 Convenience of Services

The second outcome, an indicator for Convenience of Essential Services was formed of variables for post offices, banks, doctors, small food shops, chemists, outpatients, and public transport. This indicator is consistent at both time periods, and was based on average responses across items on the original scale, 1 ('very inconvenient') to 5 ('very convenient') (section 6.1.2).

*Income models*

Table 7.6 presents the data zone-level models for the consistent indicator of Convenience that control for the SIMD. In the individual-level models, Convenience was explained by a few demographic characteristics, most clearly age and household type, while income was not a significant predictor. Controlling for area-level deprivation, age no longer holds a pattern with Convenience and only the oldest age group is associated with lower average levels of Convenience in 1999-2002. This implies that the impact of deprivation explaining access to services was reflected in the coefficients for age, as deprived areas are more likely to have older populations.

The individual-level models also found a significant negative coefficient for private renters regarding Convenience. When area deprivation is controlled for, tenure has a stronger negative pattern with Convenience as social renters are also less likely to find services convenient at both time periods. While the coefficient values are very small, this implies that social renting contributes to lower levels of perceived service access independently of area-level deprivation.

Area-level deprivation contributes to the differences in levels of Convenience, but only negatively so in the more affluent quintiles 3 and 4. Interestingly, the two most deprived quintiles do not appear to have worse Convenience that the most affluent. Indeed, the most deprived quintile has slightly better

convenience in 1999-2002. This suggests that areas that are in the middle in terms of average levels of affluence are likely to experience lower levels of access to services. The pattern could partly be explained by the varying locations of areas in each quintile, and the subsequent models will control for further area predictors.

Table 7.6 Income models for Convenience of Essential Services. SHS 1999-2002, 2009-2011.

| | **Convenience of Essential Services, 1999-2002** | | **Convenience of Essential Services, 2009-2011** | |
|---|---|---|---|---|
| | **b** | **se** | **b** | **se** |
| SIMD quintile 1 | .0494754* | 0.0249686 | 0.0449416 | 0.0233951 |
| SIMD quintile 2 | 0.0242535 | 0.0243885 | 0.0089303 | 0.022482 |
| SIMD quintile 3 | -.1255588*** | 0.0245129 | -.0715776** | 0.0220184 |
| SIMD quintile 4 | -.1237476*** | 0.0243995 | -.1182431*** | 0.0218285 |
| SIMD quintile 5 | | | | |
| <=25 | 0 | . | 0 | . |
| 26-35 | -0.0037985 | 0.0206264 | 0.0444247 | 0.0272471 |
| 36-45 | -0.0220842 | 0.0210105 | -0.0171302 | 0.0270272 |
| 46-55 | -0.0307977 | 0.0215709 | -0.042714 | 0.0274929 |
| 56-65 | 0.0209543 | 0.0242237 | -0.0038076 | 0.0294742 |
| 65+ | -.1269416*** | 0.0314114 | -0.0570264 | 0.0341744 |
| Male | 0 | . | 0 | . |
| Female | -.045816*** | 0.01009 | -.0608847*** | 0.010214 |
| Single adult | 0 | . | 0 | . |
| Small/large adult | -.0481054** | 0.0170613 | 0.0028761 | 0.016951 |
| With children | -.0429326* | 0.0174148 | 0.0167081 | 0.0178505 |
| Pensioners | -0.0301265 | 0.0238105 | -0.0089021 | 0.0216574 |
| Employers and managers | 0 | . | 0 | . |
| Professional/Intermediate | -0.0081225 | 0.0211556 | -0.0093337 | 0.0240476 |
| Service/Supervisors | .0618005** | 0.0202853 | 0.0070723 | 0.0235336 |
| Manual workers/routine | .0469328* | 0.0212974 | 0.0071104 | 0.0247072 |
| Looking after home | .0681628** | 0.0261523 | -0.0050787 | 0.0304754 |
| Retired | -0.0394721 | 0.0263863 | -.0727401** | 0.0271784 |
| Jobseeker | 0.0048652 | 0.0400065 | 0.0035559 | 0.0357975 |
| Disabled | -.2437196*** | 0.028871 | -.1665682*** | 0.0300429 |
| £0-6000 | 0 | . | 0 | . |
| £6000-10000 | 0.0294089 | 0.0159319 | -0.0160993 | 0.0240389 |
| £10-15000 | -0.018764 | 0.0168241 | -0.0110513 | 0.0231744 |
| £15-20000 | -0.0078625 | 0.0192342 | -0.0251768 | 0.0242064 |
| £20000+ | -0.025138 | 0.0194816 | -0.0257396 | 0.0234676 |
| Owner | 0 | . | 0 | . |
| Private rent | -.0911794*** | 0.0239925 | -0.0182819 | 0.0198318 |

| | | | | |
|---|---|---|---|---|
| Social rent | -.0787768*** | 0.0128337 | -.0309389* | 0.013806 |
| <1 year | 0 | . | 0 | . |
| <=10 years | -0.0110503 | 0.0184823 | 0.015647 | 0.0208473 |
| 11+ years | 0.0136739 | 0.019887 | -0.009055 | 0.0223129 |
| Constant | 4.148458*** | 0.0371097 | 4.176454*** | 0.0433013 |
| Level 2 variance | -.9075085*** | 0.0174534 | -.9015501*** | 0.0160553 |
| Level 1 variance | -.3487108*** | 0.0048641 | -.4245665*** | 0.0053662 |
| BIC | 59588.47 | | 49829.27 | |
| N | 25618 | | 22419 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

*Tenure mix models*

The models in Table 7.7 include the tenure mix clusters as well as other area predictors. Out of the three broad sets of service outcomes, Convenience has the most variance explained by tenure mix differences in both time periods. In the model for the 1999-2002 data, the variance explained by between-area variation is at 27%, which is only a slight reduction from an initial model without individual-level variables (omitted). In the full model (Table 7.7), all the cluster variables yield significant positive coefficients ($p$<0.001), implying that residents in more mixed areas are more likely to find services convenient than those in the default OO cluster. The clusters OO-PR and SOC-OO appear stronger predictors of convenience compared to the owner-dominated clusters ($b$= 0.27 and $b$=0.34, respectively, both $p$<0.001), although differences are in comparison to the default OO cluster. In other words, Convenience may be greater for residents in mixed areas with more modest amounts of owner-occupied housing. This suggests that if the extent of tenure mixing introduced into social housing areas exceeds a certain point, service outcomes may decline.

In the 2009-2011 Convenience model, the variance explained by the area-level is lower than in the 1999-2002 model, at 23.4% (omitted). This implies that differences between areas matter slightly less in explaining Convenience in the later time period. The pattern for the tenure clusters is similar to the 1999-

2002 model, with significant and positive coefficients. The coefficient values are slightly lower compared to the earlier years.

At both time periods, the coefficients for the individual-level variables remain to a large extent similar to the first single-level models (Chapter 6). As with Frequency of Use, the significant negative coefficients for private and social renters indicate that renters are less likely to find services convenient compared to owners. This is consistent at both time periods, although the coefficients are smaller in the later period with the coefficient for private rent no longer significant. This points to differences in respect to tenure groups persisting despite mixed areas generally being more likely to have convenient services.

Compared to the previous models (Table 7.6), the relationship with area deprivation has changed quite considerably. After including controls for tenure mix and urbanity, residents in quintiles 1-4 are consistently less likely to report convenience, with the most deprived quintile having the largest negative coefficient ($b$ =-0.18, $p$<0.001). Particularly rural locations now explain negative variation in Convenience, which implies that the pattern in the income models was partly confounded by the location of areas within the SIMD quintiles.

In relation to RQ2, the coefficients for the SIMD quintiles are slightly smaller in the later model. This points to deprivation being a somewhat less important explanatory factor for Convenience in 2009-2011, but the reductions in the coefficients are perhaps too small to imply that deprived areas have narrowed the difference to less deprived areas in a substantive way. Instead, the persistent negative pattern with deprivation should be noted.

Table 7.7 Models for Convenience of Essential Services. SHS 1999-2002, 2009-2011.

| | **Convenience of Essential services, 1999-2002** | | **Convenience of Essential services, 2009-2011** | |
|---|---|---|---|---|
| | **b** | **se** | **b** | **se** |
| OO | 0 | . | 0 | . |
| OO-SOC 1 | .1312619*** | 0.022475 | .1442049*** | 0.0203188 |
| OO-SOC 2 | .2055629*** | 0.028384 | .1694555*** | 0.0260467 |
| OO-PR | .2727323*** | 0.037477 | .2745712*** | 0.0294152 |
| SOC-OO | .3384254*** | 0.031874 | .213717*** | 0.035422 |
| SIMD quintile 1 | -.1806233*** | 0.033992 | -.151747*** | 0.0315862 |
| SIMD quintile 2 | -.1250941*** | 0.029013 | -.1308824*** | 0.026308 |
| SIMD quintile 3 | -.1610704*** | 0.026683 | -.1217259*** | 0.0239343 |
| SIMD quintile 4 | -.0816624*** | 0.024196 | -.0933022*** | 0.0213769 |
| SIMD quintile 5 | 0 | . | 0 | . |
| Urban | 0 | . | 0 | . |
| Small towns | -.0632684* | 0.025167 | 0.021623 | 0.0240984 |
| Remote small | .0968325* | 0.038602 | .1455204*** | 0.0322558 |
| Rural | -.4460567*** | 0.019991 | -.4597391*** | 0.0184483 |
| <=25 | 0 | . | 0 | . |
| 26-35 | 0.001689 | 0.020508 | 0.0431175 | 0.0275325 |
| 36-45 | -0.00835 | 0.020893 | 0.0065408 | 0.0273354 |
| 46-55 | -0.00945 | 0.021465 | -0.0050518 | 0.0278394 |
| 56-65 | 0.042774 | 0.024103 | 0.0306201 | 0.0298535 |
| 65+ | -.1046257*** | 0.03124 | -0.0324402 | 0.0346007 |
| Male | 0 | . | 0 | . |
| Female | -.0493278*** | 0.010032 | -.0594229*** | 0.0103198 |
| Single adult | 0 | . | 0 | . |
| Small/large adult | -0.03269 | 0.016975 | 0.0090613 | 0.0171258 |
| With children | -0.02209 | 0.017366 | 0.0236334 | 0.0180863 |
| Pensioners | -0.01709 | 0.023682 | 0.0004517 | 0.0218483 |
| Employers and managers | 0 | . | 0 | . |
| Professional/Intermediate | -0.01457 | 0.021018 | -0.0125298 | 0.0243256 |
| Service/Supervisors | .0600849** | 0.020155 | -0.001859 | 0.0238127 |
| Manual workers/routine | .0507006* | 0.021167 | 0.0102613 | 0.025018 |
| Looking after home | .0766006** | 0.025985 | -0.0006792 | 0.0307569 |
| Retired | -0.04359 | 0.026229 | -.0869929** | 0.0274828 |
| Jobseeker | 0.01147 | 0.039745 | -0.0085687 | 0.0361467 |
| Disabled | -.2440773*** | 0.028698 | -.183165*** | 0.0303634 |
| £0-6000 | 0 | . | 0 | . |
| £6000-10000 | 0.025615 | 0.01584 | -0.010488 | 0.024254 |
| £10-15000 | -0.02272 | 0.01672 | 0.0036872 | 0.0233813 |
| £15-20000 | -0.00915 | 0.019118 | -0.0085728 | 0.0244427 |
| £20000+ | -0.02305 | 0.019361 | -0.0019381 | 0.0236934 |
| Owner | 0 | . | 0 | . |

| | | | | |
|---|---|---|---|---|
| Private rent | -.094214*** | 0.024 | -0.0342059 | 0.0201788 |
| Social rent | -.093779*** | 0.01285 | -.0491895*** | 0.0140675 |
| <1 year | 0 | . | 0 | . |
| <=10 years | -0.00684 | 0.018371 | 0.0242178 | 0.0210397 |
| 11+ years | 0.020692 | 0.019764 | 0.0082762 | 0.0225151 |
| Constant | 4.140741*** | 0.037013 | 4.159026*** | 0.0436535 |
| Level 2 variance | -1.043459*** | 0.019403 | -1.158493*** | 0.0217134 |
| Level 1 variance | -.3483676*** | 0.004853 | -.4061043*** | 0.0055459 |
| BIC | 58963.61 | | 46445.59 | |
| N | 25617 | | 21150 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

*Individual service items*

Next, Tables 7.8 and 7.9 present the models for the Convenience of all the service items included at each time period. Most of the separate models for Convenience are consistent with the results for the combined indicators (Table 7.7). In 1999-2002, the tenure clusters have clearly higher average levels of Convenience compared to the reference cluster (OO) in nearly all services after controlling for geographical area type, with the exception of outpatients for the OO-SOC cluster ($b$=-.0.04, $p$>0.05). While all clusters yield a greater likelihood of reporting Convenience compared to the majority owner (OO) cluster, the clusters OO-PR and SOC-OO tend to show slightly higher levels of Convenience than the owner-dominated clusters. The pattern is very similar in the 2009-2011 data, as the clusters continue to have higher levels of Convenience in most services. The later data includes an additional item, petrol stations, but this does not have significant coefficients for the clusters.

Further, the composite models showed that deprived areas have consistently lower levels of Convenience compared to the least deprived areas. However, deprivation appears to be a less important explanatory factor for two services in the later period. The Convenience of post offices is no longer significantly lower in all four quintiles, as their coefficients are closer to 0, which may be due to post offices having become less convenient across areas. Similarly, the

lowest two deprivation quintiles do not have significantly lower levels of convenience for food shops (Table 7.9). This is relatively consistent with previous evidence that has found deprived areas not to experience constraints in services such as food shops and post offices (Duffy, 2000; Bramley & Besemer, 2018; Bailey et al., 2017).

*Summary: Convenience of Essential Services*

Throughout the models for Convenience, all the mixed clusters are associated with higher levels of Convenience compared to the majority-owner cluster. The clusters with the lowest levels of owner-occupation, OO-PR and SOC-OO, hold the strongest relationships with Convenience. This implies that access to services is perceived better in areas with relatively high levels of tenure mix. Although urbanity was controlled for, it should be kept in mind that these areas tend to be located near inner cities, providing good access to many facilities. Furthermore, the models show relatively little change in between-area differences over the ten-year period. However, private and social renters are consistently more likely to report lower levels of Convenience. This may point to differences between tenures persisting despite the presence of tenure mix in small areas.

Table 7.8. Logit models for individual service items, Convenience of Essential Services. SHS 1999-2002.

| **Convenience of Essential Services, 1999-2002** | **Post offices** | **Banks** | **Doctors** | **Grocery/food shops** | **Chemists** | **Outpatients** | **Public transport** |
|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | .4492125*** | .3461246*** | .2782995*** | .4326149*** | .4716273*** | -0.036602 | .2527098*** |
| OO-SOC 2 | .5705908*** | .3980762*** | .3112729*** | .6944688*** | .6051457*** | 0.107612 | .475903*** |
| OO-PR | .6886183*** | .5292172*** | .3420702*** | .8355905*** | .755004*** | .3685048** | .6275881*** |
| SOC-OO | .8380885*** | .7807878*** | .4573711*** | .974912*** | 1.056319*** | .5630028*** | .9054191*** |
| SIMD quintile 1 | -.2580028** | -.467567*** | -.2331277* | -.6376173*** | -.6226008*** | -0.0785924 | -0.1233653 |
| SIMD quintile 2 | -.2552022** | -.3190715*** | -.2476553** | -.4510724*** | -.5704691*** | 0.0775072 | 0.0394975 |
| SIMD quintile 3 | -.3692947*** | -.3848802*** | -.3083529*** | -.4213156*** | -.6243917*** | 0.0186686 | -.2117554** |
| SIMD quintile 4 | -.1817217** | -0.1261442 | -.2417419*** | -.1807116** | -.3322093*** | 0.0624883 | -.2067816** |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | 0.066858 | 0.0913874 | .2417594*** | 0.0569416 | 0.011571 | -.6191776*** | -.5486905*** |
| Remote small | -0.0771705 | .518665*** | .4573319*** | 0.0370525 | 0.0177183 | .7517347*** | -.5456759*** |
| Rural | -.1754689** | -.7369794*** | -.184172*** | -.665266*** | -1.087751*** | -.8535665*** | -1.799106*** |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | -0.0071278 | -0.0031058 | 0.1056617 | -0.1014618 | -0.0362508 | 0.1074067 | -0.0915437 |
| 36-45 | 0.0025384 | -0.0272162 | 0.0980051 | -0.0712688 | 0.0106053 | 0.07994 | -.1919301** |
| 46-55 | 0.0726401 | 0.0418773 | .1792752** | -0.1144184 | 0.0717527 | -0.0223996 | -.2018602** |
| 56-65 | 0.1137863 | 0.1109809 | .3149053*** | -0.1121054 | .1604656* | 0.1127827 | -0.046502 |
| 65+ | -.2065122* | -0.1092078 | -0.0338646 | -.4661408*** | -0.145817 | -0.0273159 | -.2571967** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Female | -0.0030712 | -.0578395* | -0.0403036 | -.0787889** | -0.0519843 | -.129573*** | -0.0464946 |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -0.0182777 | -.1366591** | -0.0413956 | -.1705377*** | -.1041637* | -0.0215489 | -.1512735** |
| With children | 0.086989 | -0.0903573 | 0.0237204 | -.1878496*** | -0.0241387 | -0.0714753 | -.1413854** |
| Pensioners | 0.0524767 | 0.007026 | 0.0266919 | -.217506** | -0.0825014 | -.1286268* | 0.0048809 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | -0.0204893 | -0.1038706 | 0.0368481 | -0.0505475 | 0.0013225 | -0.040159 | 0.0268358 |
| Service/Supervisors | .2175373*** | 0.0862411 | .2079855*** | 0.0200331 | 0.1097968 | -0.0615391 | .2923069*** |
| Manual workers/routine | .1792942** | .1236629* | .1378791* | -0.0371321 | 0.0878458 | -0.076152 | .2689496*** |
| Looking after home | .3627322*** | 0.1086961 | .2913514*** | -0.0149882 | .1544691* | -0.0952512 | .3882599*** |
| Retired | 0.0425994 | -0.1319973 | 0.0247552 | -.1794558* | -0.1114998 | -.2805807*** | 0.1398106 |
| Jobseeker | 0.1135025 | 0.0189981 | 0.1842902 | -0.0529954 | -0.0679213 | -.2782532* | .3348762** |
| Disabled | -.2580061** | -.4369138*** | -.2291524** | -.6701593*** | -.4548583*** | -.5383364*** | -.2792099*** |
| 0-6000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| £0-6000 | 0.0458649 | 0.0793075 | 0.0739436 | .1314516** | 0.05559 | 0.0684585 | -0.0039525 |
| £6000-10000 | -0.0384379 | 0.0129595 | -0.0610807 | -0.003185 | -0.0084116 | 0.0607911 | -.1444821** |
| £10-15000 | -0.0156061 | 0.0353685 | -0.0228611 | 0.0440795 | -0.0066833 | .1255643* | -.1270917* |
| £15-20000 | -.1264303* | 0.0019406 | -0.0228584 | 0.051089 | -0.0266135 | .2132681*** | -.2689898*** |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | -.1872833** | -0.0645502 | -.2644661*** | -.1427536* | -0.088817 | -.1962815** | -0.1099827 |
| Social rent | -.110617** | -.1593162*** | -.2317795*** | -.1751231*** | -.2120177*** | -.3494818*** | 0.0189729 |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| <=10 years | -0.0672274 | -0.0360979 | -0.047766 | -0.072121 | -0.0320065 | 0.0321119 | -0.0419846 |
| 11+ years | 0.0468914 | 0.026472 | 0.0135134 | -0.0269492 | 0.0297582 | 0.0619273 | 0.0161052 |
| Cut1 | -3.88094*** | -3.281673*** | -3.283508*** | -4.660197*** | -4.228317*** | -2.587821*** | -3.477207*** |
| Cut 2 | -2.623485*** | -1.871906*** | -1.871002*** | -3.420545*** | -2.857078*** | -1.101114*** | -2.377067*** |
| Cut 3 | -2.405935*** | -1.628445*** | -1.650939*** | -3.178496*** | -2.659508*** | -.7916073*** | -2.043068*** |
| Cut 4 | 0.1241141 | .5322959*** | .5673579*** | -.6884881*** | -0.1797204 | 1.477479*** | -0.0718172 |
| Constant | .9762233*** | 1.089638*** | .845664*** | .9230105*** | 1.37381*** | 1.368396*** | 1.212379*** |
| BIC | 51426.83 | 62971.32 | 60524.43 | 50701.9 | 54500.28 | 69031.62 | 58793.59 |
| N | 25513 | 25020 | 25473 | 25555 | 25526 | 25181 | 24683 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | |

Table 7.9. Logit models for individual service items, Convenience of Essential Services. SHS 2009-2011.

| Convenience of E. Services, 2009-2011 | Post offices | Banks | Doctors | Grocery/food shops | Chemists | Outpatients | Petrol stations | Public transport |
|---|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | .4414759*** | .2041569** | .4025335*** | .7399433*** | .5221681*** | 0.0482923 | 0.0845013 | .4525031*** |
| OO-SOC 2 | .5466304*** | .3276379*** | .4005966*** | .7909665*** | .6416792*** | 0.113926 | 0.2109376 | .6006169*** |
| OO-PR | .5297774*** | .7025895*** | .4556957*** | .771839*** | .8427547*** | .3041169** | -0.2072255 | .7289389*** |
| SOC-OO | .5359806*** | .3761365** | .5782369*** | .6777506*** | .7670423*** | .3392123** | 0.27803 | .5422441** |
| SIMD quintile 1 | -0.0608702 | -.9315589*** | -.7868455*** | -0.1170927 | -.5326565*** | -.2845306** | -.3869681* | -0.1319026 |
| SIMD quintile 2 | -0.1733242 | -.5219973*** | -.5738811*** | -0.2178473 | -.6019205*** | -0.0846265 | -0.2426326 | -.3758879** |
| SIMD quintile 3 | -0.0610951 | -.4738886*** | -.488303*** | -.2580387* | -.5533928*** | -0.0703921 | -0.1073628 | -.4352888*** |
| SIMD quintile 4 | -0.0969888 | -.363912*** | -.4459956*** | -.2631804* | -.3979945*** | -0.0238487 | -0.1836652 | -.2231023* |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | .9265705*** | 0.0729185 | .6480699*** | 0.021588 | .5709712*** | -.5169563*** | -.5938532*** | -.5722677*** |
| Remote small | .8571068*** | .8302476*** | .5883201*** | -0.2377434 | .3379146* | .768542*** | .5655975** | -.631584*** |
| Rural | 0.0906742 | -.9000152*** | -.4095497*** | -1.048366*** | -1.363651*** | -.8611005*** | -1.462794*** | -2.190642*** |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | -0.1010684 | 0.0111957 | .2896185** | -.5327602* | 0.0852221 | 0.1489214 | 0.061602 | -0.3129364 |
| 36-45 | -0.1977232 | -0.0618734 | .2411859* | -.7450553** | 0.1041032 | 0.0636426 | -0.0894926 | -.4995585** |
| 46-55 | -0.2631934 | 0.0150956 | 0.2094817 | -.8788747*** | -0.1518512 | -0.0211131 | -0.1309552 | -.494973** |
| 56-65 | -0.1190082 | 0.0886742 | .423611*** | -.8626077*** | -0.0078041 | -0.0950666 | -0.274807 | -0.2719214 |
| 65+ | -.3721226* | 0.1516831 | 0.197218 | -1.187837*** | -0.2494203 | -0.2206466 | -.4065974* | -.498825** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Male | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Female | -.0895421* | -.1400857*** | -.1698272*** | -.2679188*** | -.2097512*** | -.2276287*** | -.1515224** | -.2352055*** |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | 0.0650895 | -0.0356789 | 0.0309355 | 0.0746865 | 0.0824268 | -0.1003097 | -0.0043811 | -0.0131464 |
| With children | .1632529* | 0.0273402 | .1584324* | 0.0002617 | 0.1144699 | -0.0852905 | -0.1106417 | -0.066196 |
| Pensioners | -0.1044495 | -0.041241 | 0.0662636 | 0.1616622 | 0.062833 | -0.0567902 | -0.0237103 | 0.0567676 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | -0.0930576 | -.1876316* | -0.014417 | 0.0956023 | 0.0560749 | -0.0197649 | 0.0349843 | -0.1716106 |
| Service/Supervisors | 0.0613473 | -0.0542614 | 0.0765464 | -0.0548668 | 0.1125474 | -0.016494 | 0.0736784 | 0.0155988 |
| Manual workers/routine | .2660224* | 0.045078 | 0.1142692 | 0.1448774 | 0.0380767 | -0.1205566 | 0.0998984 | 0.1941864 |
| Looking after home | 0.1039907 | -0.0733428 | 0.2421571 | -0.1221303 | 0.0851588 | -0.202655 | -0.0441608 | 0.2971437 |
| Retired | -0.0793577 | -.2911446** | -0.116284 | -.4302668** | -0.1745399 | -0.1730659 | -0.1302905 | -0.0797381 |
| Jobseeker | 0.2053995 | -0.1333861 | 0.2111216 | -0.0125206 | 0.1535226 | -.2718135* | -.3659* | 0.155193 |
| Disabled | -.3757033** | -.469184*** | -0.2165693 | -.6502074*** | -.4392666** | -.415821*** | -.5925666*** | -.4051689** |
| £0-6000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | 0.0197107 | 0.0048367 | -0.0512734 | 0.002929 | 0.0655506 | -0.0448921 | -0.0296601 | -0.0293156 |
| £10-15000 | 0.023931 | 0.0065476 | 0.0337943 | -0.1162157 | 0.0037994 | 0.0630367 | 0.1224935 | -0.1717501 |
| £15-20000 | -0.1063817 | -0.0055742 | 0.0562725 | -0.0480262 | 0.0672251 | 0.1107888 | 0.1270824 | -.255801* |
| £20000+ | -0.0984562 | -0.0241503 | 0.0058219 | -0.0502755 | 0.133765 | .252098** | .2374506* | -.3564948** |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | -0.0993309 | -0.141438 | -0.1391765 | -0.2209888 | -0.1716925 | -0.0406184 | -.3362381*** | -.2131179* |
| Social rent | -0.0353787 | -.1365378** | -.3006391*** | -.3052892*** | -.2082824** | -.2120632*** | -.3426794*** | -0.0075289 |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| <=10 years | 0.0807672 | 0.05805 | 0.1529437 | .2629612* | 0.1502182 | 0.034782 | 0.0947953 | 0.0625014 |
| 11+ years | 0.0113397 | 0.0223808 | 0.0702375 | 0.2478566 | 0.1314105 | 0.0210042 | 0.127737 | -0.0300912 |
| Cut1 | -3.145398*** | -3.763717*** | -4.331326*** | -4.425738*** | -3.062978*** | -4.705243*** | -4.12994*** | -4.187272*** |
| Cut 2 | -2.78019*** | -2.744108*** | -2.929865*** | -4.100729*** | -2.672358*** | -3.201211*** | -3.377881*** | -3.697419*** |
| Cut 3 | -2.187125*** | -2.271136*** | -2.091955*** | -2.929865*** | -1.815557*** | -1.378782*** | -2.865829*** | -2.242166*** |
| Cut 4 | -1.919341*** | -1.855367*** | -1.720278*** | -2.587084*** | -1.432879*** | -.9017*** | -2.640659***- | .3446464*** |
| Constant | 1.46841*** | 1.043937*** | .7409906*** | 1.346211*** | 1.519924*** | 1.234595*** | 1.734329*** | 1.132825*** |
| BIC | 21645.31 | 28644.01 | 23433.47 | 12670.87 | 18960.79 | 34998.59 | 18477.25 | 17236 |
| N | 20951 | 20618 | 21004 | 21032 | 21031 | 20651 | 17995 | 20330 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

### 7.3.3 Satisfaction with Services

A consistent indicator for Satisfaction at both time periods was made up of Leisure Services (libraries, parks, museums, sports), while the 2009-2011 data has an additional indicator for the Satisfaction with Public Services (health, police, fire, refuse collection, schools, social care, public transport, street cleaning). The scales were based on the original coding of the items, ranging from 'very dissatisfied' (1) to 'very satisfied' (5) (section 6.1.2).

*Income models*

Including area-level deprivation into the models for Satisfaction (Table 7.10) does not substantively change the patterns discovered in the previous chapter for the individual-level predictors. Individual income does not account for significant variation in any of the Satisfaction indicators, while age and household type remain significant predictors of Satisfaction with both Leisure and Public Services. Jobseekers and those with disabilities were less likely to report Satisfaction with Leisure Services in the first time period in the individual-level model, but their coefficients do not remain significant in the model controlling for deprivation. As with Convenience, the diminished association may be due to the higher proportions of these populations in deprived areas.

Area deprivation is associated with lower average levels of Satisfaction with Leisure Services at both time periods. In 1999-2002, the lowest two quintiles have significant albeit small negative coefficients, while in 2009-2011, quintile 1 as well as quintiles 3 and 4 are significant predictors (Table 7.10). Overall for Leisure Services, the gradient across the deprivation quintiles appears to have reduced somewhat. This implies that there may have been some levelling of differences over time. Interestingly however, the deprivation quintiles do not yield a significant pattern for the outcome in Public Services. Previous research has observed that deprivation does not have a clear negative association with

all public services and that constraints vary across specific services (e.g., Bailey et al., 2017; Duffy, 2000), but deprived areas tend to for example receive poorer quality of environmental services (see Hastings, 2009b). This will be further examined in separate models for the service items.

Table 7.10 Income models for Satisfaction with Leisure and Public Services.SHS 1999-2002 and 2009-2011.

| | **Satisfaction with Leisure Services, 1999-2002** | | **Satisfaction with Leisure Services, 2009-2011** | | **Satisfaction with Public Services, 2009-2011** | |
|---|---|---|---|---|---|---|
| | **b** | **se** | **b** | **se** | **b** | **se** |
| SIMD quintile 1 | -.0938768*** | 0.0217162 | -.0698528** | 0.0213199 | -0.023976 | 0.0165601 |
| SIMD quintile 2 | -.0768204*** | 0.0203316 | -0.0315379 | 0.0201751 | -0.0040566 | 0.0157846 |
| SIMD quintile 3 | -0.0024914 | 0.0198638 | -.0446034* | 0.019578 | -0.0022036 | 0.0154222 |
| SIMD quintile 4 | 0.0205136 | 0.0193663 | -.0406844* | 0.0194669 | -0.0261426 | 0.0153086 |
| SIMD quintile 5 | 0 | . | 0 | . | 0 | . |
| <=25 | 0 | . | 0 | . | 0 | . |
| 26-35 | .0809498*** | 0.0213151 | 0.0292277 | 0.0283656 | 0.0427013 | 0.0225193 |
| 36-45 | .13093*** | 0.0219199 | 0.0429227 | 0.028294 | .0723255** | 0.0223751 |
| 46-55 | .1608322*** | 0.0228641 | 0.0363921 | 0.0288028 | .0961506*** | 0.0226267 |
| 56-65 | .2232091*** | 0.0266527 | .0907227** | 0.0310778 | .1622786*** | 0.0242749 |
| 65+ | .3384302*** | 0.0365372 | .1389736*** | 0.0363014 | .2647444*** | 0.0281288 |
| Male | 0 | . | 0 | . | 0 | . |
| Female | 0.0198246 | 0.0113855 | -0.0023919 | 0.0109468 | -0.0097273 | 0.0083824 |
| Single adult | 0 | . | 0 | . | 0 | . |
| Small/large adult | -.0634369*** | 0.0186582 | -.0468827** | 0.0180574 | -.0324797* | 0.0139156 |
| With children | -.1083774*** | 0.0184807 | -.0677579*** | 0.0188352 | 0.0241406 | 0.0147743 |
| Pensioners | -0.032743 | 0.028022 | 0.0270913 | 0.0234454 | 0.0071107 | 0.0177871 |
| Employers and managers | 0 | . | 0 | . | 0 | . |
| Professional/Intermediate | 0.0238708 | 0.0215915 | 0.0429866 | 0.024673 | 0.0046622 | 0.0197212 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Service/Supervisors | -0.0053041 | 0.0210291 | -0.0169929 | 0.0243152 | -0.0047417 | 0.0193169 |
| Manual workers/routine | -0.0161923 | 0.0224751 | -0.0423153 | 0.0258878 | 0.0276823 | 0.0204104 |
| Looking after home | -0.0217814 | 0.0280733 | -0.0271988 | 0.031535 | 0.0274352 | 0.024866 |
| Retired | -0.0226889 | 0.029998 | 0.0095716 | 0.0287447 | .0681436** | 0.0223923 |
| Jobseeker | -0.0806838 | 0.0454498 | -0.0073787 | 0.0376753 | 0.0315659 | 0.0294358 |
| Disabled | -0.0535148 | 0.0348868 | -0.0568045 | 0.0320359 | 0.0229555 | 0.0244294 |
| £0-6000 | 0 | . | 0 | . | 0 | . |
| £6000-10000 | -0.0018827 | 0.019992 | 0.0093943 | 0.0262836 | 0.0167965 | 0.0193394 |
| £10-15000 | -0.0073674 | 0.0204569 | -0.0040936 | 0.0252763 | 0.0095091 | 0.0186921 |
| £15-20000 | -0.0294007 | 0.0225322 | -0.0036716 | 0.0264345 | -0.0082684 | 0.0196576 |
| £20000+ | 0.0123831 | 0.0225652 | 0.0146044 | 0.0255418 | 0.0029136 | 0.0190426 |
| Owner | 0 | . | 0 | . | 0 | . |
| Private rent | .0579979* | 0.0258658 | .0692407** | 0.0211213 | .0470197** | 0.0162955 |
| Social rent | -.0295906* | 0.0150903 | -.0462784** | 0.0149531 | .0371803*** | 0.0112127 |
| <1 year | 0 | . | 0 | . | 0 | . |
| <=10 years | -0.0353006 | 0.019915 | -.0718133** | 0.0221266 | -0.0260819 | 0.017104 |
| 11+ years | -.0506792* | 0.0218178 | -.1099797*** | 0.0237237 | -0.0329099 | 0.0182439 |
| Constant | 4.231762*** | 0.0381821 | 4.139516*** | 0.0453468 | 3.849771*** | 0.0351274 |
| Level 2 variance | -1.552186*** | 0.0401086 | -1.298713*** | 0.027219 | -1.522185*** | 0.0263151 |
| Level 1 variance | -.3570615*** | 0.0057737 | -.4016533*** | 0.0058626 | -.5881582*** | 0.0053732 |
| BIC | 41527.94 | | 41885.27 | | 39936.47 | |
| N | 18759 | | 19255 | | 22306 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

*Tenure mix models*

Out of the three outcomes, the Satisfaction indicators have the lowest amounts of variance explained by between-area differences. For Satisfaction with Leisure Services, the full model explains 8% of the variation in 1999-2002 and 9% in 2009-2011. The low explanatory power is reflected in the coefficients for the area predictors, which do not form clear patterns with Satisfaction. In 1999-2002, the tenure clusters have positive but very small coefficients ($b$ = <0.1) in a similar manner to the rural area categories (small towns and rural areas) (Table 7.11). In turn, the household predictors continue to explain variation in Satisfaction to a larger extent compared to the area predictors, with age having the clearest pattern.

For the 2009-2011 consistent indicator for Leisure Services, a significant positive coefficient stands out for the mixed cluster OO-PR ($b$ = 0.14, $p$<0.001), while the other clusters do not hold significant coefficients (Table 7.11). Thus, residents in these mixed areas are on average more likely to report satisfaction with Leisure Services. The coefficient for OO-PR is now clearly larger compared to the first period, and this may imply that the area type gained strength in explaining outcomes in Satisfaction in the later period. Explanations for this could potentially relate to closures due to austerity, and greater reliance on private amenities, such as sports clubs. Meanwhile, the negative coefficient for social rent ($b$ = -0.04, $p$<0.01) is consistent with findings for the previous outcomes and may imply that differences between tenure types hold despite controlling for tenure mix.

For the Public Services indicator, the variance explained by the data zone level is 7.6% in the final model, up from 7% in the initial model (omitted). The tenure clusters account for very little variation, with OO-PR having a significant negative association ($b$ = -0.05, $p$<0.05, Table 7.11). This implies that more mixed areas have lower average levels of Satisfaction with Public Services, while they are more likely to report Satisfaction with Leisure Services.

In contrast with the previous outcomes, social and private renting account for small positive variations in Satisfaction with Public services (Table 7.11). This is inconsistent with particularly social renters' lower likelihood of reporting frequent use of Leisure Services and Necessities, although only the Necessities indicator covers some of the same services. Overall, this model implies that social and private renters are more likely to be satisfied with Public Services regardless of the levels of satisfaction in mixed areas. It is possible to hypothesise that renters use these public services more, leading to more positive perceptions, while the result could also be related to higher standards for public services held by owner-occupiers (e.g., Clark & Kearns, 2017).

The relationship of deprivation appears to be less pronounced in relation to Satisfaction with services than for the other service outcomes. Areas in the most deprived SIMD quintile are consistently less likely to report satisfaction with Leisure Services (Table 7.11). The pattern of change over time is similar for quintiles 1 and 2 in the income models and the full models for Leisure Services, both holding negative coefficients which decrease in the later period when tenure mix and urbanity is controlled for (Tables 7.10, 7.11). In the full models, the importance of deprivation seems to decrease in the later period, which points to area differences having possibly narrowed between the time periods.

Table 7.11 Models for Satisfaction with Leisure and Public Services.SHS 1999-2002, 2009-2011.

| | **Satisfaction with Leisure Services (consistent), 1999-2002** | | **Satisfaction with Leisure Services (consistent), 2009-2011** | | **Satisfaction with Public Services, 2009-2011** | |
|---|---|---|---|---|---|---|
| | **b** | **se** | **b** | **se** | **b** | **se** |
| OO | 0 | . | 0 | . | 0 | . |
| OO-SOC 1 | .040225* | 0.018762 | -0.01764 | 0.018497 | 0.008194 | 0.01454 |
| OO-SOC 2 | 0.028664 | 0.024225 | -0.02146 | 0.033121 | -0.01847 | 0.025755 |
| OO-PR | .0767075* | 0.033189 | .1368209*** | 0.023978 | -.0523961* | 0.01879 |
| SOC-OO | .0797029** | 0.027076 | 0.049698 | 0.027292 | -0.0395 | 0.021722 |
| SIMD quintile 1 | -.1242083*** | 0.029822 | -.0957559** | 0.029484 | -0.00586 | 0.023153 |
| SIMD quintile 2 | -.0970828*** | 0.024925 | -0.03115 | 0.024328 | -0.00106 | 0.019219 |
| SIMD quintile 3 | -0.03642 | 0.022386 | -0.0353 | 0.022152 | 0.007502 | 0.01758 |
| SIMD quintile 4 | 0.003772 | 0.020027 | -0.03104 | 0.019854 | -0.01867 | 0.015782 |
| SIMD quintile 5 | 0 | . | 0 | . | 0 | . |
| Urban | 0 | . | 0 | . | 0 | . |
| Small towns | -.0592278** | 0.021056 | -.0939007*** | 0.021715 | -0.01225 | 0.017002 |
| Remote small | -0.04973 | 0.031808 | -0.01745 | 0.028413 | .0692063** | 0.022254 |
| Rural | .0397743* | 0.016968 | -.0388857* | 0.016825 | -.0604513*** | 0.013104 |
| <=25 | 0 | . | 0 | . | 0 | . |
| 26-35 | .0760566*** | 0.020602 | 0.030626 | 0.028379 | 0.04141 | 0.023203 |
| 36-45 | .1166592*** | 0.021185 | 0.041206 | 0.028315 | .0718591** | 0.023098 |
| 46-55 | .1498374*** | 0.022135 | 0.041137 | 0.028883 | .0962915*** | 0.023409 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 56-65 | .2193575*** | 0.025794 | .0975085** | 0.031142 | .1600329*** | 0.02512 |
| 65+ | .33058*** | 0.035294 | .1517933*** | 0.03623 | .2629648*** | 0.029058 |
| Male | 0 | . | 0 | . | 0 | . |
| Female | 0.017 | 0.011019 | 0.010336 | 0.010894 | -0.01103 | 0.008639 |
| Single adult | 0 | . | 0 | . | 0 | . |
| Small/large adult | -.0546697** | 0.018121 | -.0426045* | 0.017999 | -.035734* | 0.014339 |
| With children | -.0820325*** | 0.018039 | -.0680788*** | 0.018893 | 0.023442 | 0.015274 |
| Pensioners | -0.02622 | 0.027143 | 0.023543 | 0.023254 | 0.006027 | 0.018262 |
| Employers and managers | 0 | . | 0 | . | 0 | . |
| Professional/Intermediate | 0.016923 | 0.020923 | 0.042514 | 0.024681 | 0.010221 | 0.020353 |
| Service/Supervisors | -0.00505 | 0.020329 | -0.0094 | 0.024266 | -0.00429 | 0.019908 |
| Manual workers/routine | -0.01079 | 0.021732 | -0.03234 | 0.025871 | 0.030697 | 0.021057 |
| Looking after home | -0.01389 | 0.027148 | -0.00951 | 0.031417 | 0.033295 | 0.025627 |
| Retired | -0.02246 | 0.028954 | 0.017078 | 0.028574 | .0714995** | 0.023079 |
| Jobseeker | -0.05757 | 0.04391 | -0.01677 | 0.0376 | 0.038839 | 0.030262 |
| Disabled | -0.04693 | 0.033577 | -0.04807 | 0.031785 | 0.029164 | 0.025154 |
| £0-6000 | 0 | . | 0 | . | 0 | . |
| £6000-10000 | 0.005562 | 0.019302 | 0.001072 | 0.025946 | 0.009829 | 0.019898 |
| £10-15000 | -0.00371 | 0.019756 | -0.00688 | 0.024979 | 0.004673 | 0.019242 |
| £15-20000 | -0.02432 | 0.021752 | -0.00896 | 0.026112 | -0.01412 | 0.020213 |
| £20000+ | 0.019308 | 0.021811 | 0.01185 | 0.025297 | -0.00281 | 0.019629 |
| Owner | 0 | . | 0 | . | 0 | . |
| Private rent | 0.031158 | 0.025393 | .0506318* | 0.021277 | .0428154* | 0.01696 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Social rent | -0.01452 | 0.014764 | -.0422959** | 0.014974 | .0332371** | 0.011666 |
| <1 year | 0 | . | 0 | . | 0 | . |
| <=10 years | -.0382* | 0.019294 | -.0657907** | 0.022051 | -0.03198 | 0.017602 |
| 11+ years | -.0466699* | 0.021131 | -.1034157*** | 0.023617 | -.0384601* | 0.018769 |
| Constant | 4.214449*** | 0.037441 | 4.109099*** | 0.045382 | 3.875543*** | 0.036259 |
| Level 2 variance | -1.602467*** | 0.040811 | -1.54524*** | 0.038484 | -1.834779*** | 0.043333 |
| Level 1 variance | -.3815431*** | 0.005713 | -.398265*** | 0.005945 | -.5561912*** | 0.005513 |
| BIC | 41210.33 | | 39795.55 | | 38143.92 | |
| N | 19035 | | 18553 | | 21084 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

*Individual service items*

Finally, Satisfaction is modelled for each individual service. The first period includes one additional item omitted from the consistent indicator, swimming facilities, while the later one includes two, theatres/concert halls, and community centres.

The composite indicators for Satisfaction were found to have less consistent patterns with the area variables. However, there is likely to be variation in the level of satisfaction across the different services, which the individual items allow us to see. The models show a pattern similar to that in Frequency of Use, which included the same Leisure Services (Table 7.12). In 1999-2002, the mixed clusters OO-PR and SOC-OO have higher average levels of Satisfaction with parks and museums (and the cluster OO-SOC 2 also with parks). In turn, deprived areas tend to have lower levels of Satisfaction with parks and museums (and significantly so in SIMD quintiles 1 and 2), as well as swimming and sports facilities.

The 2009-2011 models repeat this pattern, with the OO-PR cluster having higher average levels of Satisfaction with parks, museums, and theatres/concert halls, and SOC-OO higher levels of Satisfaction with parks (Table 7.13). However, deprived areas no longer have significant negative coefficients for museums and sports, which implies a potential positive change. Respondents in deprivation quintiles 2 and 3 are more likely to report Satisfaction with community centres. Further, comparing the SOC-OO and OO-SOC 2 areas, the likelihood of satisfaction with parks and museums is lower in the more mixed cluster OO-SOC 2 at both time periods.

The composite models showed that particularly age contributed to differences in levels of Satisfaction with Leisure Services, and this holds to a large extent in all separate models. However, age does not contribute significantly to

Satisfaction with theatres/concert halls, sports, and community centres in the later period (Table 7.13). As with the composite indicator, social renters have lower average levels of Satisfaction, but only significantly so for museums and theatres.

Out of the Public Services in the 2009-2011 data, the OO-PR cluster has significantly higher average levels of Satisfaction with health services and public transport, but lower levels with refuse collection, schools, and street cleaning. The higher level of satisfaction with public transport is in line with higher Frequency of Use in more mixed areas. Meanwhile, the lower levels of satisfaction with the two environmental services could be related to the prevalence of environmental problems in mixed areas, if they experience high turnover and traffic.

Comparing areas with high levels of social renting, the more mixed areas (OO-SOC 2) do not yield a significant association with refuse collection and therefore appear to be in a better position in comparison with social rent-dominated (SOC-OO) areas, which yield significant negative coefficients for this service. This implies that more mixing may be beneficial in regard to refuse collection in areas with social housing. In addition, the separate models show that deprived areas tend to have significantly lower levels of satisfaction with street cleaning, which is in line with previous research on poorer provision of environmental services in deprived areas (Hastings, 2009b).

Of the tenure groups, social renters have higher levels of Satisfaction with fire brigades, schools, and social care (Table 7.14). The levels of Satisfaction with schools and social care may reflect higher levels of use for this group related to the demographic characteristics of social renters. Furthermore, both private and social renters are more likely to be satisfied with street cleaning compared to owners, which may in part relate to a higher visibility of street maintenance in these areas.

*Summary: Satisfaction with Services*

While the composite indicators for Satisfaction did not show strong patterns for the area predictors, the individual models provide a more complicated picture. Satisfaction with Leisure Services reflects patterns in the consistent indicator for Frequency of use, which consisted of the same services. To a large extent, the groups of respondents with higher levels of Frequency of Use also report higher Satisfaction levels. In particular, the models point to differences between areas with regards to cultural facilities. Cultural facilities and parks have higher levels of both Use and Satisfaction in mixed areas, while generally lower levels in deprived areas.

Reports of satisfaction are likely to not only reflect respondents' perception of quality, but to some extent also access to services. The levels of Satisfaction for the tenure clusters were thought to reflect in part location, as residents in mixed inner-city areas have better access to cultural facilities, which in turn are often not provided in deprived areas. The results are further likely to be influenced by cultural preferences where residents in mixed areas differ from residents in deprived areas. These preferences may be influencing the results as unmeasured characteristics, so that for example people that want to attend cultural venues choose to live nearby them, while community centres are important to people in deprived areas.

Results for a group of Leisure Services were also compared over time. There were no substantive changes in the levels of Satisfaction for the tenure clusters over time. In turn, deprivation continued to account for differences in Satisfaction for some services. The later data showed lower levels of Satisfaction with street cleaning, while a stronger negative relationship with Satisfaction with parks appeared in deprived areas. This points to the prevalence of poorer provision of environmental services in response to problems in deprived areas.

Table 7.12 Logit models for individual service items, Satisfaction with Leisure Services. SHS 1999-2002.

| **Satisfaction with Leisure Services, 1999-2002** | **Libraries** | **Parks** | **Museums** | **Swimming** | **Sports** |
|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | -0.0642603 | 0.115863 | 0.040602 | .1943929** | 0.1266226 |
| OO-SOC 2 | -0.0457704 | .1539606* | 0.084902 | 0.1018994 | 0.106967 |
| OO-PR | 0.0655768 | .2691969* | .3370965* | .260321* | 0.1805483 |
| SOC-OO | -0.1911137 | .3475007*** | .3766206*** | 0.0420896 | -0.0836358 |
| SIMD quintile 1 | 0.0592044 | -.5001115*** | -.2764801* | -0.1180363 | -0.1849928 |
| SIMD quintile 2 | .239665* | -.3707047*** | -.3223073** | -0.1248882 | -.2606522* |
| SIMD quintile 3 | .2611231** | -0.0817412 | -.2293907* | -0.126386 | -0.1146701 |
| SIMD quintile 4 | 0.0561158 | -0.0195387 | -0.0602799 | 0.0728329 | 0.0116018 |
| Urban | 0 | 0 | 0 | 0 | 0 |
| Small towns | -0.0318414 | -.1781984** | -0.1956065 | -0.0031649 | -0.111776 |
| Remote small | 0.0920614 | -.2300926* | -.3813423** | -.4465489*** | -0.0182536 |
| Rural | 0.1114302 | .1940694*** | -0.0462152 | .2236728*** | 0.0928995 |
| <=25 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | .3357227*** | .3150584*** | 0.1656091 | .278795*** | 0.1352426 |
| 36-45 | .4045576*** | .3834122*** | .387915*** | .2794155*** | 0.13349 |
| 46-55 | .7414529*** | .5538189*** | .5306067*** | .4121975*** | .3259943*** |
| 56-65 | 1.092761*** | .6859323*** | .7436357*** | .8054739*** | .5925416*** |
| 65+ | 1.485023*** | .9903385*** | .7764019*** | .9423287*** | 1.093947*** |

| | | | | | |
|---|---|---|---|---|---|
| Male | 0 | 0 | 0 | 0 | 0 |
| Female | .2121958*** | -0.0196005 | .2698565*** | 0.0627479 | 0.0965123 |
| Single adult | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -0.0593106 | -.1315912* | -.2262416** | -0.0614188 | -0.075279 |
| With children | .1522044* | -.2726415*** | -.3002385*** | -0.0266965 | -0.0861716 |
| Pensioners | -0.0552891 | -0.0890589 | -0.0815939 | 0.0536748 | -0.0754289 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | -0.0902374 | 0.1004025 | -0.1219704 | -0.0293439 | 0.0621457 |
| Service/Supervisors | 0.0442608 | -0.0750134 | -0.0995953 | -0.0613745 | -0.0048364 |
| Manual workers/routine | 0.140119 | -0.0826558 | -0.172507 | -0.0233651 | 0.0348237 |
| Looking after home | 0.0613857 | -0.0943071 | -0.1919309 | -0.0562403 | -0.0067933 |
| Retired | 0.0087774 | -0.0458718 | -0.0131508 | -0.0421752 | -0.0542333 |
| Jobseeker | -0.0022063 | -0.211658 | -0.4392539 | 0.0815197 | 0.007473 |
| Disabled | 0.1778293 | -0.1096384 | -0.0371623 | 0.1723264 | 0.2742636 |
| £0-6000 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | 0.0922504 | -0.0905289 | .2198687* | 0.158885 | .2311002* |
| £10-15000 | -0.0227318 | -0.1218687 | 0.1919257 | 0.1171447 | .2264237* |
| £15-20000 | -0.0296624 | -.1992286** | 0.1048951 | -0.0038052 | 0.0632264 |
| £20000+ | -0.0759786 | -0.1324758 | .205425* | 0.1279309 | 0.1365318 |
| Owner | 0 | 0 | 0 | 0 | 0 |
| Private rent | 0.0574069 | .2745586*** | 0.0310876 | 0.0356866 | 0.0187987 |
| Social rent | -0.0058798 | -0.0728668 | -0.0332214 | 0.1279466 | -0.0031273 |

| | | | | | |
|---|---|---|---|---|---|
| <1 year | 0 | 0 | 0 | 0 | 0 |
| <=10 years | -0.0382741 | -0.0745001 | -0.0066513 | -0.0623921 | -0.0839917 |
| 11+ years | 0.0357484 | -.1770055** | -0.0036522 | -0.0170242 | -0.021605 |
| Cut 1 | -3.946465*** | -3.683535*** | -5.058307*** | -3.690716*** | -4.289642*** |
| Cut 2 | -1.709079*** | -2.033303*** | -2.541047*** | -1.821213*** | -2.305252*** |
| Constant | .4302585*** | .4851033*** | .4069903*** | .3986171*** | .35982*** |
| BIC | 19285.36 | 37481.55 | 14460.34 | 19601.33 | 16617.41 |
| N | 9829 | 16685 | 7753 | 9134 | 8281 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | |

Table 7.13 Logit models for individual service items, Satisfaction with Leisure Services. SHS 2009-2011.

| Satisfaction with Leisure Services, 2009-2011 | Libraries | Parks | Museums/ galleries | Theatres/ concert halls | Sports | Community centres |
|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | |
| OO-SOC 1 | -0.0726839 | .1568308* | -0.1152262 | 0.0044992 | -0.0160952 | -0.0306087 |
| OO-SOC2 | -0.1612982 | 0.1635355 | -.2404445* | -0.1615714 | -0.0666265 | -0.1984928 |
| OO-PR | -0.095776 | .4377216*** | .6958881*** | .5555403*** | -0.0734174 | -.2900641* |
| SOC-OO | 0.0219548 | .3790156** | 0.0414875 | -0.0189218 | 0.1938138 | -0.086147 |
| SIMD quintile 1 | 0.1184433 | -.8392492*** | 0.0369154 | -0.2610313 | 0.0049242 | 0.1506945 |
| SIMD quintile 2 | 0.1905812 | -.6251719*** | -0.0213043 | -.3329734** | 0.1924907 | .2567039* |
| SIMD quintile 3 | 0.0566534 | -.3282022*** | -0.0481002 | -.2106786* | 0.092898 | .2188194* |
| SIMD quintile 4 | -0.0486508 | -.2250254* | -0.1653532 | -0.168632 | -0.0265722 | 0.1464558 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | 0.003498 | -.204853* | -.4833055*** | -.2721279** | -.2746982** | .2242218* |
| Remote small | -0.0041216 | -0.100216 | -.514625*** | -.5909108*** | 0.1538508 | .3849663** |
| Rural | -.1588267* | -0.0553191 | -.4406069*** | -.4553922*** | -.1647527* | .3217555*** |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | 0.1024118 | 0.1372594 | .361293** | 0.1569753 | -0.0271003 | 0.148038 |
| 36-45 | 0.1077299 | 0.2050089 | .2675023* | 0.0368522 | -0.0909792 | 0.0677273 |
| 46-55 | 0.2372218 | .3191227** | .3695523** | 0.0940695 | -0.1540363 | 0.0162007 |
| 56-65 | .4362263** | .3897299** | .5168066*** | 0.1460543 | -0.1539134 | 0.1088891 |
| 65+ | .5265171** | .4007638* | .4015493* | 0.19742 | -0.1651931 | 0.1616835 |
| Male | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Female | 0.0916167 | -0.0241593 | 0.0528786 | .1867391*** | -0.0027564 | 0.0274206 |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -0.0973554 | -.1614775* | -0.0748681 | -0.1024158 | -0.0359885 | 0.0076102 |
| With children | .4611788*** | -.4256905*** | -0.0731693 | -.2703901** | 0.0783866 | 0.1484068 |
| Pensioners | 0.165988 | -0.0089913 | 0.1702131 | 0.0058647 | 0.1504053 | 0.2114472 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | 0.146234 | 0.0721826 | 0.0246752 | 0.1625349 | 0.0935305 | 0.1936305 |
| Service/Supervisors | 0.0521238 | -0.1468664 | -0.1451266 | 0.0368051 | 0.0645646 | .2162274* |
| Manual workers/routine | 0.0831131 | -.2695994* | -.3358617** | -0.0821194 | 0.1949862 | .2673631* |
| Looking after home | 0.1231285 | -.3104716* | -0.2124091 | -0.0137858 | 0.0259465 | 0.124821 |
| Retired | 0.056284 | -.3125366* | -0.1292012 | -0.1061827 | 0.0455433 | 0.2050235 |
| Jobseeker | 0.191614 | -0.1848686 | -.452232* | -0.2815817 | 0.0638595 | 0.1533551 |
| Disabled | 0.0073013 | -.5906515*** | -.3344549* | -.3038969* | -0.1753033 | -0.007591 |
| £0-6000 | 0 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | 0.0587522 | 0.0422378 | -0.0328527 | -0.005687 | -0.0155563 | 0.1478861 |
| £10-15000 | -0.0803741 | -0.0071743 | 0.0462237 | 0.109995 | 0.0517237 | 0.0892434 |
| £15-20000 | -0.0338515 | 0.0966867 | 0.0158821 | 0.1264849 | 0.0270859 | 0.143858 |
| £20000+ | -0.0942229 | 0.1458735 | 0.1277699 | 0.2259507 | 0.1712291 | 0.1279238 |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | 0.120205 | 0.174124 | 0.000739 | -0.0717106 | 0.1743762 | 0.0239427 |
| Social rent | -0.1387819 | -0.0754587 | -.22291** | -.2503492*** | -0.1069424 | -0.0677495 |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 |
| <=10 years | -0.117023 | -.2194448* | -0.0920799 | 0.0749354 | -0.0264283 | -0.1405212 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11+ years | -0.1451844 | -.3236085** | -0.0954282 | -0.0182146 | -0.071575 | -0.0927523 |
| Cut 1 | -3.066361*** | -3.284662*** | -3.402454*** | -3.159173*** | -2.176143*** | -2.007604*** |
| Cut 2 | -1.53267*** | -2.33713*** | -1.372905*** | -1.443349*** | -1.134197*** | -0.1844613 |
| Constant | .3559448*** | .4273774*** | .8293716*** | .6241102*** | .4564024*** | .4989402*** |
| BIC | 13632.2 | 18055.1 | 14617.7 | 15449.58 | 19329.2 | 15750.84 |
| N | 13435 | 16251 | 11007 | 11389 | 12902 | 9624 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | |

Table 7.14 Logit models for individual service items, Satisfaction with Public Services. SHS 2009-2011.

| Satisfaction in Public Services, 2009-2011 | Health services | Police | Fire | Refuse collection | Schools | Social care | Public transport | Street cleaning |
|---|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | 0.077066 | -.1399643* | -0.09154 | -0.04898 | -0.09854 | .1770399* | 0.107493 | .1239417* |
| OO-SOC 2 | -0.07289 | -0.1377 | 0.033151 | -0.07424 | -0.08067 | 0.070228 | 0.089385 | 0.048974 |
| OO-PR | .2390261* | 0.070506 | 0.029782 | -.5853407*** | -.6464753*** | -0.09204 | .296301** | -.302692*** |
| SOC-OO | -0.09209 | -0.16762 | -0.04304 | -.2425917* | -0.1789 | 0.174925 | 0.091136 | -0.0715 |
| SIMD quintile 1 | 0.006004 | -0.07455 | .4814262*** | 0.115399 | 0.023663 | 0.125429 | 0.041729 | -.2714023** |
| SIMD quintile 2 | -0.15677 | 0.05894 | .4249634*** | 0.122724 | 0.040775 | 0.149014 | 0.009272 | -.2040791** |
| SIMD quintile 3 | -0.04335 | 0.125474 | .3404299*** | .174959* | 0.130681 | -0.01881 | -0.1155 | -.176904* |
| SIMD quintile 4 | 0.010456 | 0.032824 | 0.166639 | -0.03334 | -0.06839 | -0.08116 | -0.07976 | -0.11942 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | -0.14318 | -.1860571** | 0.058809 | 0.123324 | .2474051* | .2218629* | -.405293*** | 0.12588 |
| Remote small | -.2828768** | 0.025422 | .3061486* | .5657873*** | 0.245969 | .2416589* | -.2695744* | .6160277*** |
| Rural | -0.10903 | -0.03095 | 0.140064 | 0.092791 | .2727315*** | .2306783** | -1.459837*** | -0.03466 |
| <=25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26-35 | .2375545* | 0.086405 | 0.085823 | -0.01036 | -0.19463 | -0.18527 | -0.01537 | 0.003941 |
| 36-45 | .2290898* | 0.068594 | 0.186951 | 0.177375 | 0.12105 | -0.14123 | -0.06388 | -0.00015 |
| 46-55 | .3395975** | 0.15771 | .3384888* | .3104977** | 0.028857 | -0.03121 | -0.10306 | 0.042993 |
| 56-65 | .4567071*** | 0.185688 | .3568339* | .397992*** | 0.241606 | 0.052583 | 0.116936 | 0.009303 |
| 65+ | .6222893*** | .3628017** | .4073889* | .7458798*** | 0.018567 | .4518801* | .2845059* | 0.119929 |
| Male | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Female | -.1076418* | .1726127*** | 0.059082 | -0.0681 | -0.01417 | -.1063396* | -.1413144*** | -.0845012* |
| Single adult | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small/large adult | -.1617592* | -0.09862 | 0.106172 | -.1538691* | .2298171* | -0.02013 | -0.07087 | -0.07104 |
| With children | -0.01081 | 0.109058 | .2016434* | -.2624973*** | .908916*** | 0.053202 | -0.10282 | -0.07468 |
| Pensioners | -0.03258 | 0.077795 | 0.09379 | .1923524* | .397285*** | -0.03924 | 0.125363 | -0.1482 |
| Employers and managers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional/Intermediate | 0.021321 | 0.135226 | 0.030242 | 0.138706 | 0.115933 | -0.10801 | -0.04966 | 0.008908 |
| Service/Supervisors | 0.100438 | -0.01186 | 0.120563 | 0.051728 | 0.140562 | 0.153711 | 0.011088 | -0.0483 |
| Manual workers/routine | 0.080473 | 0.02646 | .2740887* | .2389379* | .3674589** | .4306499*** | .2114727* | 0.070536 |
| Looking after home | 0.085297 | 0.05367 | 0.113255 | 0.147147 | 0.15974 | .4137399** | 0.14467 | -0.02123 |
| Retired | .3228624** | 0.055272 | 0.08565 | .2854278* | -0.06492 | .4098393** | 0.123987 | 0.13866 |
| Jobseeker | 0.277162 | 0.0846 | 0.272291 | 0.016767 | .4305181* | 0.053755 | 0.260551 | -0.2051 |
| Disabled | -0.02021 | -0.0067 | 0.272925 | 0.13552 | -0.00396 | .412841** | 0.029987 | 0.039098 |
| £0-6000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| £6000-10000 | 0.088297 | -0.04463 | 0.014855 | 0.10261 | 0.07541 | 0.164438 | -0.06141 | -0.02955 |
| £10-15000 | 0.036631 | 0.039706 | 0.030369 | 0.14878 | 0.086749 | 0.07543 | -0.09893 | -0.04595 |
| £15-20000 | 0.063422 | -0.01429 | 0.044912 | -0.00221 | -0.00211 | 0.06271 | -.2479527* | -0.14784 |
| £20000+ | -0.00195 | 0.008141 | 0.07757 | -0.01223 | 0.064776 | 0.131476 | -.261745** | -0.11396 |
| Owner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private rent | -0.01976 | -0.00108 | -0.0442 | 0.133255 | 0.029559 | 0.083732 | 0.005641 | .244259*** |
| Social rent | -0.00415 | -0.03074 | .2275664** | 0.089636 | .1568996* | .1546819* | -0.00703 | .1890593*** |
| <1 year | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| <=10 years | -0.06932 | -0.02573 | 0.080027 | -0.02597 | 0.055671 | -0.01535 | -0.01513 | -0.14691 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11+ years | 0.012583 | -0.03564 | .254109* | 0.057505 | 0.237644 | 0.11879 | -0.08115 | -.2375304** |
| Cut 1 | -2.178281*** | -1.906029*** | -1.87105*** | -1.618896*** | -2.423883*** | -1.83702*** | -2.586306*** | -2.028573*** |
| Cut 2 | -1.67407*** | -.8726166*** | -.7166431*** | -1.22542*** | -.8694086*** | 0.041145 | -1.778944*** | -1.482774*** |
| Constant | .1777632*** | .1502992*** | .5207508*** | .3499555*** | .2581406*** | .4359424*** | .6277115*** | .2388177*** |
| BIC | 18951.95 | 26208.82 | 13300.44 | 21502.27 | 12566.94 | 14065.49 | 24237.43 | 28894.04 |
| N | 20594 | 17663 | 14254 | 20817 | 11630 | 8336 | 17853 | 19793 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

### 7.3.4 Summary of data zone-level models

Table 7.15 provides a summary of the significant relationships for the tenure clusters and each composite indicator in the data zone-level models. While the coefficient values in most cases were low, a pattern emerges particularly in regard to Convenience. All the clusters contribute positively to variations in the indicator for Convenience at both time periods. Frequency of use appeared to be the outcome that had the least amount of variation explained by the clusters, with Frequency of use of Necessities not having any significant relationships with the tenure clusters. Satisfaction with Leisure Services is partially explained by three of the clusters in the first time period, but only one in the later period.

In relation to Research Question 1, the results imply that residents in mixed areas tend to hold better perceptions of local services in some aspects compared to areas mostly consisting of owner-occupation. The outcomes for mixed areas did not experience drastic changes over time, but fewer tenure clusters contributed to the variation in Satisfaction with Leisure Services in the later period compared to the first period.

By including the clusters into the models, we were further able to examine if a particular type of mix is associated with improved outcomes. A key finding from the data zone-level models is that the cluster OO-PR explains variations in a majority of outcomes, and is more likely to contribute positively to outcomes. This cluster refers to the type of mix with the most even proportions of owners, private renters, and social renters (OO-PR). Its positive result is also consistent in the two time periods for Convenience of Essential Services and Satisfaction with Leisure Services. In turn, Satisfaction with Public Services measured in 2009-2011 was likely to be lower in these areas.

It is further interesting to compare the clusters with the highest levels of social renting. The majority social rent cluster SOC-OO was associated with more

positive outcomes compared to OO-SOC 2, indicating better outcomes in Frequency of Use and Satisfaction with Leisure Services in 1999-2002 (Table 7.15). Comparing these area types implies that introducing higher levels of owner-occupation to areas with large proportions of social renting may not aid service outcomes.

As the coefficients of the tenure clusters were not substantially changed by the inclusion of the SIMD or the urban/rural categories, tenure mix appears to represent an aspect not captured by the SIMD or urbanity. However, a significant finding was made in regard to deprivation, which explained larger shares of the outcomes compared to tenure mix. The negative patterns shown by the SIMD quintiles were persistent over time for both for the Frequency of use and Satisfaction with Leisure Services, and Convenience of Services.

Table 7.15 Summary of significant associations of tenure clusters and outcomes. SHS 1999-2002, 2009-2011.

| **Model** | **OO-SOC 1** | **OO-SOC 2** | **OO-PR** | **SOC-OO** |
|---|---|---|---|---|
| Frequency of Use of Leisure Services, 1999-2002 | | | | + |
| Frequency of Use of Leisure Services, 2009-2011 | | | + | |
| Frequency of Use of Necessities, 2009-2011 | | | | |
| Convenience of Essential Services, 1999-2002 | + | + | + | + |
| Convenience of Essential Services, 2009-2011 | + | + | + | + |
| Satisfaction with Leisure Services, 1999-2002 | + | | + | + |
| Satisfaction with Leisure Services, 2009-2011 | | | + | |
| Satisfaction with Public Services, 2009-2011 | | | - | |

Note: += positive coefficient, -= negative coefficient, both significant at the p<0.05 level. All shown relative to the default OO cluster.

## 7.4 Are the outcomes for tenure mix mediated by location?

The results in section 7.3 suggest that the relationship between tenure mix and the service outcomes may partly be mediated by location and hence proximity to services. This emerged particularly in relation to the higher rates of Convenience for mixed areas, as this outcome is most likely to be affected by access. All mixed areas had a greater likelihood of Convenience compared to the areas that are dominated by owners (cluster OO). A large proportion of the latter areas are rural, meaning the urban/rural categories control for geographical differences between the area types to an extent. However, mapping the tenure clusters (see Appendix A1) also showed that a majority of the mixed areas (OO-PR and to some extent SOC-OO) that helped to explain variations in multiple outcomes are located in or close to inner city areas, in contrast to many of the owner-dominated clusters in suburban and rural areas. Therefore, the service outcomes associated with these clusters are likely to be affected by their location. Despite having a category 'large urban areas', the urban/rural indicator does not allow us to control for location *within* the urban area. To further control for location, therefore, we rerun a set of models for the composite indicators including density measured as the ratio of population to area size. The measure for density is derived from linking the data zone land area from Scottish Government Statistics to Census population data at 2001 and 2011.

For the eight composite outcome measures, Table 7.16 summarises the resulting models (not showing individual or household variables to save space). Density has significant positive correlations for all but two of the service outcomes. Residents in areas with higher density are slightly more likely to use Leisure Services frequently, and find services convenient at both time periods, which is likely related to the ease of access to services in inner city areas. In

turn, density does not explain more frequent use of Necessities or Satisfaction with Leisure or Public Services.

As density is controlled for, only the most evenly mixed cluster, OO-PR, retains significant coefficients for most service outcomes as in the previous models. In addition, all the mixed clusters were found to have higher average levels of Convenience, which still holds at both time periods. The OO-PR cluster also continues to explain higher average levels of Satisfaction with Leisure Services at both time periods. However, while the OO-PR previously had a significant coefficient for Satisfaction with Public Services (2009-2011), it no longer holds when density is controlled for. Previously significant associations for clusters SOC-OO and OO-SOC 1 in Frequency of Use and Satisfaction with Leisure Services (1999-2002), respectively, no longer hold.

Therefore, the adjusted models imply that most positive outcomes for residents in mixed areas are not entirely explained by location measured through density, and unlike we expected, the most mixed area type, OO-PR, continues to yield positive associations. In addition, adjusting for density does not diminish the coefficients for the SIMD quintiles, which continue to produce significant negative coefficients for most outcomes (Table 7.16).

Table 7.16 Service outcome indicator models controlling for density. SHS 1999-2002, 2009-2011. Note: Ind. predictors omitted.

| | **Frequency of Use of Leisure Services, 1999-2002** | **Frequency of Use of Leisure Services, 2009-2011** | **Frequency of Use of Necessities, 2009-2011** | **Convenience of Essential Services, 1999-2002** | **Convenience of Essential Services, 2009-2011** | **Satisfaction with Leisure Services, 1999-2002** | **Satisfaction with Leisure Services, 2009-2011** | **Satisfaction with Public Services, 2009-2011** |
|---|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | -0.02455 | 0.000295 | 0.014846 | .1234775*** | .1696595*** | 0.028174 | -0.03698 | 0.009954 |
| OO-SOC 2 | 0.002978 | -0.01979 | -0.01662 | .2234001*** | .2089407*** | 0.012438 | -0.04682 | -0.00144 |
| OO-PR | .0786444* | .0750097* | -0.02763 | .1997647*** | .1730165*** | .0721297* | .0832869** | -0.03879 |
| SOC-OO | 0.026901 | 0.00828 | -0.0154 | .250866*** | .2170394*** | 0.055435 | 0.0135 | -0.02097 |
| Density | .001326*** | .0010708*** | .0008238*** | .0033182*** | .0031078*** | 0.0000712 | .0009168*** | 0.0000733 |
| SIMD quintile 1 | -.3818077*** | -.2718775*** | -0.0361 | -.190997*** | -.1675032*** | -.1218139*** | -.0754361* | -0.0166 |
| SIMD quintile 2 | -.3538855*** | -.209412*** | -.0450146* | -.1475425*** | -.1547784*** | -.0928567*** | -0.01249 | -0.0061 |
| SIMD quintile 3 | -.2689095*** | -.1753667*** | -.0526987** | -.2058791*** | -.1720148*** | -0.01749 | -0.02934 | -0.00594 |
| SIMD quintile 4 | -.1339823*** | -.1423212*** | -0.02495 | -.1490752*** | -.144704*** | 0.011872 | -0.02344 | -0.02852 |
| Constant | 3.681065*** | 2.512392*** | 3.878338*** | 3.959244*** | 3.980139*** | 4.211483*** | 4.050316*** | 3.854975*** |
| Level 2 variance | -1.230248*** | -1.237301*** | -1.50409*** | -.9784399*** | -.9646277*** | -1.557116*** | -1.313033*** | -1.523496*** |
| Level 1 variance | -.0115466* | -.3354816*** | -.4146002*** | -.3488921*** | -.4255011*** | -.357052*** | -.4282344*** | -.5879176*** |
| BIC | 73963.2 | 51310.76 | 47322.1 | 59248.38 | 49358.48 | 41566.22 | 41558.32 | 39896.19 |
| N | 25534 | 22271 | 22382 | 25617 | 22376 | 18759 | 19543 | 22252 |
| * p<0.05, ** p<0.01, *** p<0.001. | | | | | | | | |

## 7.5 Intermediate-level analysis

This Chapter has focused on models using data zones for the small area level, corresponding to a neighbourhood level which is considered more likely to foster collective action. However, it can be argued that for some services, it is also relevant to use a higher area level, as a majority of the services included in the survey are provided for larger geographies. This includes post offices, banks, GP surgeries, hospitals' outpatients, dentists, libraries, chemists, community centres, and leisure and sports facilities (multiple sources[14]). Furthermore, branch closures particularly for post offices and banks will have affected the availability of many services in small areas in-between the two time periods in question (Bramley & Besemer, 2018), implying that the provision of these services has become more concentrated.

The geographical distribution of services implies that the survey responses should be clustered at the intermediate level. In Scotland the statistical geography above data zones and within local authorities is intermediate zones (IZs). Intermediate zones are made up of aggregates of data zones and consist of 2500-6000 residents[15]. To measure tenure mix at this level, Chapter 5 constructed tenure clusters for intermediate areas as well as data zones, linking these directly to the SHS data. Clustering areas at this level produced similar results to clustering at the data zone level, but a four-cluster solution was considered sufficiently distinct (see 5.4.2 for details). As a reminder,

[14] House of Commons Briefing Paper Number 02585, 21 July 2017.
http://www.isdscotland.org/Health-Topics/General-Practice/
http://www.isdscotland.org/Health-Topics/Hospital-Care/Hospitals/
www.gov.scot/Topics/Statistics/Browse/Tourism-Culture-Sports/TrendPublicLibraries
http://www.fsb.org.uk/media-centre/press-releases/bank-branches-closing-faster-in-scotland
www.gov.scot/Topics/Health/NHS-Workforce/Pharmacists/Pharmacy
http://www.gov.scot/Publications/2009/01/05144855/6 [All accessed 27/02/2019]

[15] https://data.gov.uk/dataset/133d4983-c57d-4ded-bc59-390c962ea280/intermediate-zone-boundaries-2011 [Accessed 27/02/2019]

Figure 7.4 summarises the composition of the intermediate zone clusters in the 2011 Census, as the composition is virtually identical in both time periods (see Figures 5.5 and 5.6 for comparison). As previously, the OO cluster is the least mixed.

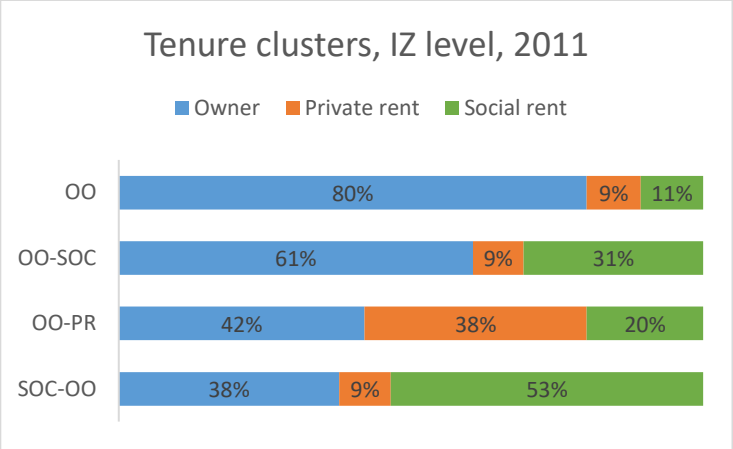


Figure 7.4 Tenure cluster compositions, intermediate zones. Source: Census 2011.

Figure 7.5 presents the mean values of the 2009-2011 service outcome indicators within the 2011 intermediate clusters. This indicates that the values are very similar to those observed for the data zone clusters (see Figures 7.2 and 7.3 above). The mean for Convenience of Services is slightly higher in all the mixed clusters compared to the majority-owner cluster, OO. The cluster OO-PR has the highest average levels in the Frequency of Use of Leisure Services, Convenience, and Satisfaction with Leisure Services. In turn, OO-PR has the lowest average Satisfaction with Public Services.

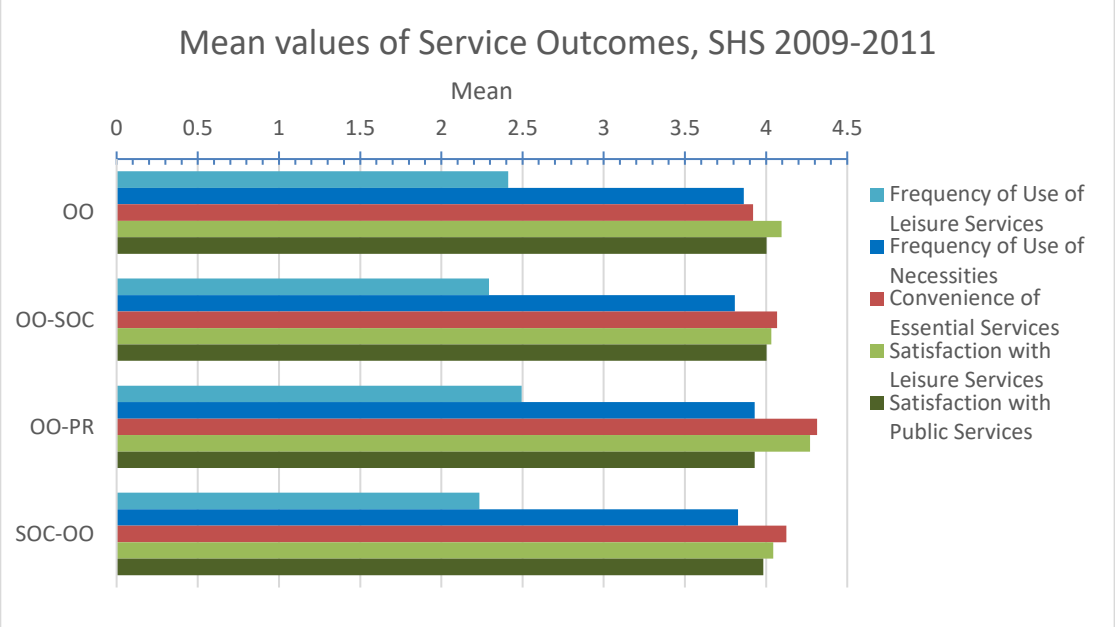


Figure 7.5 Mean values of service outcome indicators within intermediate clusters.SHS 2009-2011.

*Intermediate-level models*

In order to compare results to the data zone-level models, a similar modelling strategy is applied, this time allowing the models to provide random intercepts for intermediate zones rather than data zones. Responses in the SHS samples are nested within 1225 intermediate areas in the 1999-2002 data and 1270 intermediate areas in the 2009-2011 data.

The multilevel models are undertaken on the eight composite service outcome indicators. Household and individual predictor variables are carried on from the data zone-level models. The SIMD was recalculated to be applicable to intermediate areas (see 7.1). The urban/rural classification still corresponds to each respondent's data zone, as the classification is not separately provided for intermediate areas.

Table 7.17 provides a summary of the models focusing on the area predictors, as patterns for individual-level predictors remain very similar to the data zone-level models. The relationships between the service outcomes and tenure mix

hold to a large extent at the intermediate area level. The most evenly mixed cluster, OO-PR, retains significant coefficients for Frequency of use of Leisure Services, Convenience of Essential Services, and Satisfaction with Leisure Services. Convenience continues to have the strongest coefficients with tenure mix out of the outcomes, with all the tenure clusters accounting for positive variation. As a difference to the data zone-level models, the OO-PR cluster does not explain variance in Satisfaction with Public Services in a significant manner.

The intermediate models show little change between the time periods for the tenure clusters, but somewhat more consistency in regard to the Frequency of use of Leisure Services. The OO-PR cluster holds positive coefficients in both samples, while two clusters account for negative variation in the Frequency of Use of Leisure Services; OO-SOC and SOC-OO, the latter doing so in both time periods. Clustering areas at a higher level can be considered particularly appropriate for Leisure Services, as many facilities are concentrated in central areas (such as museums) or distributed sparsely (such as large sports facilities). This may be accounting for the contrasting patterns for more centrally located OO-PR areas and areas dominated by social rent and owner-occupation.

The models confirm the negative pattern with deprivation in nearly all service outcomes. However, the relationship of deprivation reduces in regard to two outcomes at this level. The SIMD quintiles yield negligible and mostly non-significant coefficients for the Frequency of use of Necessities (2009-2011) and Convenience (at both time periods). This implies that deprived areas do not have significantly lower levels of use of everyday services and access to services if we consider the distribution of services at a larger scale.

Table 7.17 Intermediate-level models for service outcome indicators. SHS 1999-2002, 2009-2011. Note: Individual predictors omitted.

| | **Frequency of Use of Leisure Services, 1999-2002** | **Frequency of Use of Leisure Services, 2009-2011** | **Frequency of Use of Necessities, 2009-2011** | **Convenience of Essential Services, 1999-2002** | **Convenience of Essential Services, 2009-2011** | **Satisfaction with Leisure Services, 1999-2002** | **Satisfaction with Leisure Services, 2009-2011** | **Satisfaction with Public Services, 2009-2011** |
|---|---|---|---|---|---|---|---|---|
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC | -0.0449548 | -.0674371** | -0.0300424 | .0620462* | .0596034** | -0.0062699 | -0.0185896 | -0.0039781 |
| OO-PR | .1063834* | .0745719* | 0.0135784 | .3101292*** | .2484692*** | .1012845** | .1754048*** | -0.0351946 |
| SOC-OO | -.0822439* | -.0706566* | -0.0173813 | .130382*** | .1092513** | 0.0220522 | -0.0096763 | -0.0109152 |
| SIMD quintile 1 | -.2221569*** | -.1843302*** | -0.0138802 | -0.0736366 | -0.0457871 | -.126622*** | -.1015948*** | -.0697896** |
| SIMD quintile 2 | -.2085724*** | -.1511535*** | -0.0420714 | -0.0535578 | -.0657667* | -.0990823*** | -.1360245*** | -.0507491* |
| SIMD quintile 3 | -.1541223*** | -.1175981*** | -0.0420813 | -0.0126812 | -0.0440598 | -0.045755 | -.1218097*** | -.0438654* |
| SIMD quintile 4 | -0.0146398 | -.0922441*** | 0.0074778 | -0.0212386 | -0.0248009 | -.0502903* | -.1041129*** | -.0438682* |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | -.0978** | -0.0302795 | 0.0216792 | -0.0300886 | .0675899* | -.0637777** | -.0933474*** | -0.0044161 |
| Remote small | -.16561*** | -.0943342* | -0.0468058 | 0.0445568 | .1318119** | -0.0275582 | -0.0341793 | 0.0500247 |
| Rural | -.1825768*** | -.1874545*** | -.0660503*** | -.4286868*** | -.3964457*** | .0394468* | -.0666488*** | -.0777961*** |
| Constant | 3.709086*** | 2.595078*** | 3.926218*** | 4.142557*** | 4.13709*** | 4.241874*** | 4.166428*** | 3.891798*** |
| Level 2 variance | -1.412376*** | -1.592747*** | -1.965244*** | -1.263608*** | -1.367295*** | -1.810923*** | -1.64215*** | -1.965019*** |
| Level 1 variance | 0.0026138 | -.2947374*** | -.3815208*** | -.2987321*** | -.3419468*** | -.3388417*** | -.3657206*** | -.5456385*** |
| BIC | 74153.13 | 51600.92 | 47594.25 | 59585.26 | 50114.67 | 41715.82 | 41880.89 | 40204.31 |
| N | 25620 | 22331 | 22432 | 25704 | 22426 | 18822 | 19259 | 22312 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

Therefore, applying the intermediate level accounts for small differences in the relationship between tenure mix and the service outcomes compared to the data zone level. The models confirm earlier results for the most mixed area type, owner with private rent, which is more likely to have higher levels of Convenience, and Frequency of Use as well as Satisfaction with Leisure Services. Table 7.18 summarises the significant relationships for the intermediate clusters.

Table 7.18 Summary of the associations of intermediate tenure clusters with the service outcomes. SHS 1999-2002, 2009-2011.

| **Model** | **Intermediate zone cluster** | | |
|---|---|---|---|
| | **OO-SOC** | **OO-PR** | **SOC-OO** |
| Frequency of use of Leisure Services, 1999-2002 | | + | - |
| Frequency of use of Leisure Services, 2009-2011 | - | + | - |
| Frequency of Necessities, 2009-2011 | | | |
| Convenience of Essential Services, 1999-2002 | + | + | + |
| Convenience of Essential Services, 2009-2011 | + | + | + |
| Satisfaction with Leisure Services, 1999-2002 | | + | |
| Satisfaction with Leisure Services, 2009-2011 | | + | |
| Satisfaction with Public Services, 2009-2011 | | | |

Note: += positive coefficient, -= negative coefficient, both significant at the $p<0.05$ level. All shown relative to the default OO cluster.

## 7.6 Summary

This Chapter undertook the multilevel modelling of local service outcomes derived from the Scottish Household Survey. The modelling built on the individual-level analysis in Chapter 6 in order to determine the extent to which the area-level variables contributed to the explanation of the outcomes. As a general conclusion from this Chapter, the inclusion of area-level variables did not erase individual-level associations, as for example age and household type continued to be some of the strongest correlated variables with the service outcomes. The specific aim of this Chapter was to examine the association of types of tenure mix with local services at two points in time in order to answer the Research Questions:

1. Are the access to and quality of local services perceived to be better in more mixed areas?
2. Did area differences in service access and quality reduce during the New Labour period?

To address Research Question 1, the analysis focused on the relationship between the outcomes and different types of mixed area by attaching the types of tenure mix defined through cluster analysis in Chapter 5 into the SHS data. The primary analysis using data zones as the area level found that the tenure clusters in general accounted for variations in the Frequency of Use, Convenience, and Satisfaction with local services.

The most consistent relationships appeared in relation to Convenience, as residents from all types of mixed area were more likely to find services convenient compared to areas with hardly any mix. In turn, fewer tenure clusters explained variations in Frequency and Satisfaction, which were found to be associated to a larger extent with individual and household characteristics. The cluster containing the highest level of mix, owners mixed with private rent (OO-PR), contributed to positive variation in a majority of

the outcome indicators. This pointed to the conclusion that residents in area types with the most even shares of owners and private renters, and some social renters, are more likely to hold positive perceptions of service access and quality.

A further interesting finding was that areas consisting of large shares of social renting (the cluster SOC-OO) were associated with some positive outcomes. The cluster SOC-OO had a positive relationship with Convenience in the data zone models (controlling for density), which held in the intermediate-level models. This implies that areas consisting of a relatively large social rented sector can provide services that possibly correspond to the needs and priorities of residents. Furthermore, SOC-OO appeared a stronger predictor of Convenience compared to the OO-SOC 1 cluster comprising more owner-occupation mixed with social rent. These associations suggest that if the extent of tenure mixing introduced into social housing areas exceeds a certain point, service outcomes may decline.

Furthermore, the results for the service indicators were compared at two area levels. While the data zone was originally chosen as the preferred scale to represent neighbourhoods, intermediate areas are more likely to represent the geography at which most of these services are accessed. Most of the significant relationships between the tenure clusters and the composite service indicators continued to hold at the intermediate level, where all mixed area types were particularly associated with positive outcomes in the Convenience of Essential Services. The strong pattern for the most mixed area type remained as the OO-PR cluster explained positive variations in most outcomes. Meanwhile, applying a higher area level diminished some of the results for deprived areas, which were no longer associated with lower levels of Frequency of Use of Necessities and Convenience of Essential Services at the intermediate level. This is likely to imply that while some services are not distributed in deprived data zones, residents are able to access them in the larger surrounding area.

The data zone-level analysis also examined whether the location of areas was an intervening factor in the relationship between the tenure clusters and outcomes. This was particularly pertinent to the results for Convenience of Essential Services, referring to access, as the positive outcomes for mixed areas might largely be derived from households' proximity to services. Therefore population density was introduced into the models to control for, effectively, distance from inner city areas. Despite the inclusion of density, all tenure clusters continued to account positively to the Convenience of Services, and the most evenly mixed cluster (OO-PR) retained its pattern in most outcomes. This implies that respondents in areas with mixed tenure are more likely to perceive services as convenient despite the location of the area relative to inner cities. In addition, those in the OO-PR type areas were more likely to frequently use and be satisfied with leisure services. However, controlling for density diminished some associations for the clusters with high levels of social rent. The majority social rent areas (SOC-OO) were no longer significantly associated with more frequent use and satisfaction with leisure services, and neither was OO-SOC 2 with satisfaction with leisure services in 1999-2002. This implies that results in the early period for these types of areas may have been derived from proximity to inner cities' service provision.

Although the models made an adjustment for location, conclusions about the contribution of tenure mix to local services should be made with caution. Density was used to control for the effect of location relying on the assumption that denser areas have higher levels of service provision, but some areas with lower population densities may also provide services that correspond to the needs and preferences of residents. Alternatively, the improved position of mixed areas in services may simply stem from a comparison to the reference group (OO), which covers more of suburban and rural locations.

A further issue regarding the causal link between tenure mix and services stems from the problem of prior selection into neighbourhoods. The cross-sectional samples of the SHS did not allow us to control for possible selection effects which may lead households into areas with mixed tenure compositions. It is

plausible that the positive relationship with Convenience is partly explained by the sorting of individuals with a preference to live near services and amenities to mixed areas. Further, it can be argued that areas with high shares of private renting may have good service provision, which can have made them attractive for landlords to invest in and, in turn, for renters to seek accommodation in. This would be a particularly valid explanation in the area type with the highest amount of private renters, as private renting allows for mobility and tends to account for a lot of turnover.

Further exploring Research Question 1, this chapter also addressed the potential impact of an economic capital mechanism, stemming from the assumption that increased income levels in mixed areas will contribute to sustaining levels of service provision. Therefore initial models introduced a control for area-level average income through deprivation quintiles in order to see whether average area incomes explain outcomes in services separately from individual income. The income models showed that higher area-level deprivation was significantly associated with less frequent use of Leisure Services and lower levels of Convenience and Satisfaction with Leisure Services, compared to the most affluent areas. This in turn implies that as income levels increase, service outcomes improve, meaning that higher average area income could provide benefits to all residents in mixed areas. A further important finding in itself was that area deprivation produced strong negative patterns in most of the service outcomes, which was consistent with previous research (e.g., Duffy, 2000; Bailey et al., 2017; Bramley & Besemer, 2016; Hastings, 2009b).

The economic capital argument can also be considered in light of results for individual income. While individual income did not explain variations in the two perceptual outcomes, it remained a significant predictor for Frequency of Use of Leisure Services when area deprivation was controlled for. Higher-income individuals were more likely to frequently use Leisure Services across areas. However, the survey questionnaire did not specify Frequency of Use in relation to respondents' local area, and it is likely that households with

resources thought about service use in a larger area, as previous research has identified that higher-income households tend to access many services across neighbourhoods (e.g., Atkinson & Kintrea, 2000). This somewhat questions the argument that higher-income households could help an area to sustain its provision of leisure services through an economic demand mechanism. Furthermore, the services used frequently by different income groups varied, which implies that even if households focused their service use in the local area, the increased economic demand may not be directed to many services used by lower-income groups.

As for Research Question 2, the analysis compared results from two time periods in order to examine possible impacts of the New Labour government's public service reform and social mix policies. Results from two cross-sectional samples of the SHS were obtained for the consistent indicators for Frequency of Use of Leisure Services, Convenience of Essential Services, and Satisfaction with Leisure Services. Overall, differences in the coefficient values for tenure mix within the service outcomes were not considered substantial enough to conclude that area differences may have narrowed. However, reductions in the coefficient values for most mixed clusters (OO-SOC 2, OO-PR, and SOC-OO) in Convenience of Services in the later period suggested some levelling of access to services across area types, which held when density was controlled for. The question of change was also related to deprivation, where a key finding was that differences between deprived and non-deprived areas persisted in most outcomes. There was some indication that differences between areas may have been slightly less important in explaining the perceptions of Convenience of Services and Satisfaction with Leisure Services in 2009-2011, as fewer coefficients for the tenure clusters and the SIMD were significant in the later models. This pattern of change in the SIMD quintiles was also similar when controlling for density. However, tenure mix and deprivation continued to account for variations in the outcomes in the later period, implying that significant area-level differences remained.

# 8 The contribution of social capital to the variations in local service outcomes

Following the analyses on the variation of local services by area characteristics, this Chapter undertakes modelling of the relationship of local services outcomes and area social capital in order to address Research Question 3: '*Does area social capital help to explain variations in the service outcomes?*'. The question is addressed through two separate analyses. The first part of this Chapter carries on the analysis of the SHS data using social capital variables available from SHS respondents, as described in section 8.1. Results from the multilevel models for the local service indicators are reported in section 8.2 and summarised in Section 8.3.

While the SHS data provides a large sample across Scotland, it is recognised that this approach suffers from a potential bias, as responses to the social capital items and service perceptions come from the same individuals (e.g., Dietz, 2002; Murnane & Willett, 2011). For this reason, the second part of this chapter aims to provide an additional check by linking external estimates of social capital for each data zone to the SHS data on service outcomes. As explained in Chapter 4, the external estimates are based on data from the *NHS Greater Glasgow and Clyde Health and Wellbeing Survey*. Section 8.4 outlines the methodological issues involved in constructing the estimates and the choice of variables. The section also conducts confirmatory factor analysis to determine the consistency of the variables. Section 8.5 explains considerations made in regard to the data at hand, and moves on to undertake fixed effects and random effects models to derive the local social capital estimates. Section 8.6 reports the results of modelling of the local service outcomes with the inclusion of the external social capital estimates. Section 8.7 summarises the results of this part of the chapter.

## 8.1 Social capital in the SHS

This section extends the analysis from Chapter 7 by introducing variables relating to social capital into the models. The section begins by outlining the variables from the SHS chosen for analysis and describing them within categories of tenure and the tenure clusters.

### 8.1.1 Variable choice and description

The SHS datasets hold a few variables that can be considered to represent social capital. However, as explained in section 4. 2.2, the choice of variables for this analysis needs to take into consideration consistency through the two time periods (1999-2002 and 2009-2011), as well as sample sizes. The survey includes items on meeting friends and relatives, and volunteering, but these are not restricted to the local area and therefore relate to respondents' overall social engagement. Further, the SHS asks about community spirit, but this item has small sample sizes.

For the analysis, two groups of questions are chosen. The first group is comprised of three questions found in both datasets: "*If I was alone and needed help, I could rely on one of my friends/relatives in this neighbourhood to help me*"; "*If my home was empty, I could count on one of my friends/relatives in this neighbourhood to keep an eye on my home*"; and "*I feel I could turn to friends/relatives in this neighbourhood for advice or support*". These items appear to indicate trust and support among neighbours, which are widely recognised as components of social capital in the literature (e.g., Putnam, 2000; Forrest & Kearns, 2001; Perkins & Long, 2002).

Overall, large majorities of respondents report agreement with the neighbourhood trust items at both time periods (Table 8.1), with trusting neighbours to watch the home having the highest proportions of agreement. As a group, they have very high internal consistency with Cronbach's alpha 0.9, which shows that they tap into the same underlying concept, *neighbourhood trust*. The items are coded on a 5-point Likert scale according to agreement, 5 indicating 'strongly agree'. Therefore the three items are combined into a scale named *neighbourhood trust* by taking the mean value of each respondent to all three questions, resulting in a scale from 1 to 5. This method avoids counting in missing replies to any question that could skew the resulting score for an individual. The resulting scale reflects the high levels of agreement to the items, with 85% of respondents in the early and 87% in the later dataset

having a score between 4 and 5. It should be noted that the 1999-2002 sample is much larger compared to the later one, which includes a large amount of missing replies as the survey only asked the questions of a subset of the sample (Table 8.1).

The second group of items provides yes/no responses on whether respondents have contacted their local council on a list of issues. Engagement with the council can be regarded as involvement and activity for local issues, which relates to the concept of collective efficacy. Most items included in the 1999-2002 survey concern local environmental issues, such as street cleaning and potholes therefore indicating a willingness to improve the local area. However, the list also includes council tax, which is household-specific rather than a collective issue. The question changes slightly in 2009-2011 and cannot be directly compared to the previous years' replies, as the respondents were asked whether they had used the council website for various reasons. This implies a lower threshold for contact with the council, while the list of reasons for contact varies from finding information to reporting a fault[16].

*Council contact* at both time periods is coded as 0/1, 1 indicating having contacted the council with at least one issue. In 1999-2002, 30% of respondents report contacting the council for one or more reason, while this figure is 50% in 2009-2011 (Table 8.1). The higher proportion in the later period could be expected as the question comprises more issues compared to the earlier period, and a higher percentage of people are likely to use the council website.

While being the closest available proxy, *council contact* does not address collective action as we would hope. The questionnaires refer to contacting council about a range of issues, all of which do not relate to the local area. As the question asks about individuals' contact, the item may also be an indication

[16] Using the council website for: finding information; downloading a form; making a complaint; asking a question; participating in a discussion forum; access services like reporting a fault or renewing library books; making payment like council tax or parking fine; some other purpose.

of individual empowerment. It should further be noted that contact with the council may reflect other issues in addition to potential collective efficacy, such as environmental problems concentrated in some areas, leading to higher numbers of complaints, and results should therefore be interpreted with care.

Table 8.1. Percentages and sample sizes of social capital variables in the SHS.1999-2002, 2009-2011.

| **SHS Social capital variables** | **1999-2002, % Agree/% Yes** | **1999-2002, Total N** | **2009-2011, % Agree/% Yes** | **2009-2011, Total N** |
|---|---|---|---|---|
| Neighbourhood trust | 76.3 | 42,803 | 97.3 | 10,046 |
| Council contact | 48.8 | 37,176 | 50.2 | 30,543 |

### 8.1.2 Social capital and tenure clusters

Before examining outcomes for local services in relation to social capital, we are interested in the variations of social capital by individual tenure and by data zone clusters for tenure mix. Table 8.2 shows for each tenure, the proportions of those obtaining scores of 4 or over on the neighbourhood trust scale and the proportion having contacted the council. Owner-occupiers have the highest while private renters the lowest percentage of high trust scores in both time periods (Table 8.2). This corresponds to previous research showing that owners tend to be invested in interactions with neighbours, whereas private renters' shorter tenancies may not be as conducive to this (e.g., Völker et al., 2007; Kleinhans et al., 2007). Meanwhile, owners and private renters have higher percentages of respondents who have contacted the council compared to social renters. This supports the argument that middle-class residents tend to engage more with council officials and report issues related to the local environment (Matthews & Hastings, 2011; Matthews et al., 2018). Of course, private renters are much younger than owners on average, so the impacts of age need to be taken into account and we do this in the subsequent modelling.

Table 8.2 Percentages for social capital variables in tenure categories. SHS 1999-2002, 2009-2011.

| **SHS Social capital variables, 1999-2002** | **Owner** | **Private rent** | **Social rent** | **Total N** |
|---|---|---|---|---|
| Neighbourhood trust score >=4 | 87.8% | 73.7% | 83.0% | 42,803 |
| Contacted council for one or more issue | 51.4% | 51.9% | 42.9% | 37,176 |
| **SHS Social capital variables, 2009-2011** | | | | |
| Neighbourhood trust score >=4 | 90.4% | 73.8% | 83.4% | 9853 |
| Contacted council for one or more issue | 54.3% | 53.3% | 34.2% | 30,543 |

The household-level findings are reflected in the cluster distributions. The clusters with a majority of owner-occupiers have higher proportions of residents reporting neighbourhood trust, and the remaining two clusters slightly lower proportions (Fig. 8.1). At both time periods, the majority owner cluster (OO) has the largest shares reporting trust. In line with the percentage for private renters, the cluster with the highest share of private renters, OO-PR, in turn has the lowest percentages reporting trust. This is likely to also reflect high turnover resulting from short tenancies in these areas.

The picture is somewhat different as to council contact. The mixed OO-PR cluster has the highest proportions with 60% in 1999-2002 and 53% in 2009-2011 contacting the council (Fig. 8.2). It is suspected that this could be due to issues arising from location and turnover in these areas, rather than reflect higher tendency for collective efficacy. The majority of the OO-PR cluster are located in inner city areas that might experience more environmental problems, while high turnover in privately rented dwellings would increase reports to do with council tax. Meanwhile, the majority social rent cluster (SOC-OO) has the lowest rates of contact with the council. It has been found previously that deprived areas report environmental issues to a lesser extent (Matthews et al., 2018; Hastings, 2009b), which may be reflected here as a large proportion of data zones in this cluster are classified as deprived by their SIMD ranking (Chapter 4).

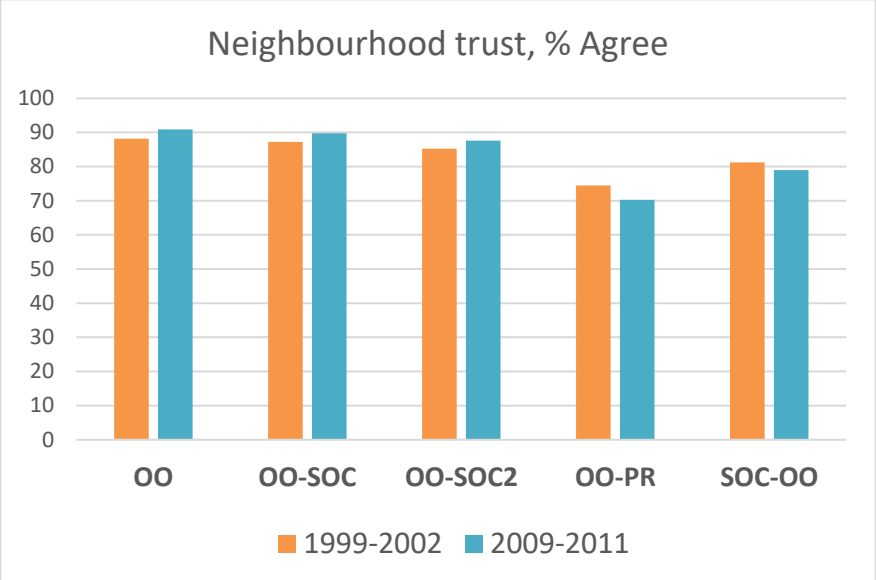


Figure 8.1 Percentages of respondents with a score of 4 or higher on Neighbourhood trust within data zone tenure clusters. SHS 1999-2002, 2009-2011.

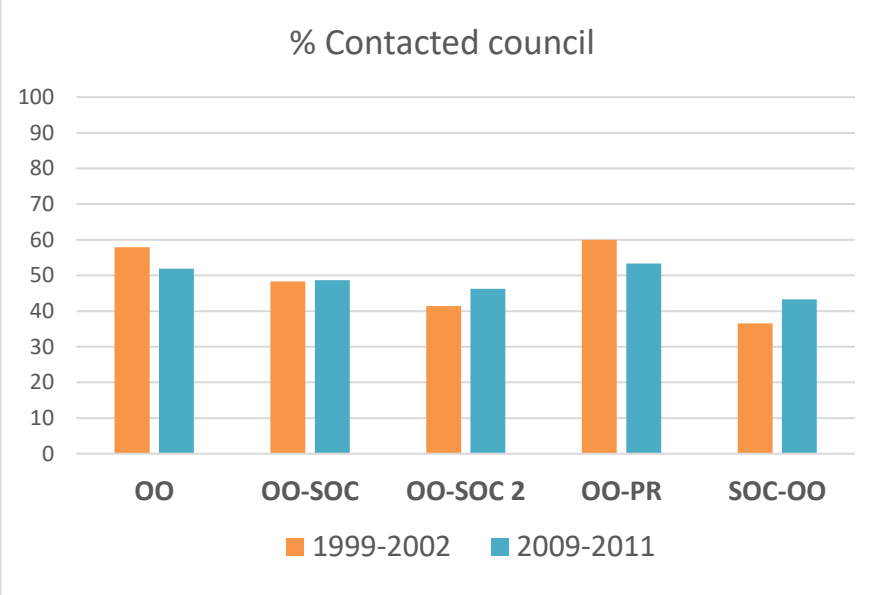


Figure 8.2 Percentages of respondents who report contacting the council within data zone tenure clusters. SHS 1999-2002, 2009-2011.

## 8.2 Multilevel models of the service outcomes using SHS social capital data

The modelling strategy is similar to the one with local services and area predictors in the previous section. The key indicators for service outcomes in both time periods are modelled as a function of area social capital in addition to the household and area characteristics defined in Chapters 6 and 7. The eight composite outcome indicators for Frequency of Use, Convenience, and Satisfaction with Services are modelled through linear random intercept models. Including social capital in the models should result in positive relationships with the outcomes, while the relationship between tenure mix category and outcomes should reduce as social capital explains at least some of the effect here.

This analysis explores the social capital mechanism in the relationship between local services and social mix that emerged from the literature review. The initiatives of New Labour particularly emphasised the ability of social mix to increase levels of social capital in communities, which would allow them to organise collectively to improve services in their local area and work in partnerships with service providers (e.g., Docherty et al., 2001; Lawless et al., 2010). The three outcomes are likely to differ in the extent that they can fulfil these assumptions. As to the first outcome, the frequency of using a service depends to a large extent on individual needs, but people are likely to increase their use if the service becomes available in their area. This can be considered to apply to many leisure services. Secondly, Convenience, referring mainly to access, is most tied to proximity out of the three outcomes. Therefore the distribution of some services is less likely to be influenced by collective action, such as some public services provided on a larger scale, while it can be argued that a community could potentially lobby for a service to be placed or retained in the area, and some service providers may avoid areas they consider to lack cohesion and be susceptible to anti-social behaviours (and weak collective efficacy). The outcome that is thought to be perhaps the most susceptible to community influence is Satisfaction, i.e., perceptions of service quality, as

local residents can engage with existing service providers and/or the council to improve and shape services.

As the two social capital variables are brought in, the choice of area level can be debated. As previously discussed, many services are provided at a larger scale that would imply the use of intermediate areas. However, the type of social capital measured by the first item concerns relations among neighbours, that can be considered relevant to a small area, even at building or block level, which we however do not have data on. Meanwhile, the second question is aimed to represent the potential for collective organising, which can take place at a larger scale depending on the issue or service concerned. We find data zone level to be the most suited for both items, and consider respondents clustered at the data zone level ('level 2').

Predictor variables are carried on from the previous modelling. As social capital does not change the relationships with other predictors in most cases, we focus on presenting results for social capital and the additional area predictors: the tenure clusters, SIMD, and urban/rural category. Furthermore, previous research has found density, along with residential instability, to predict social capital (McCulloch, 2003; Swaroop & Morenoff, 2006; Fischer, 1982; Sampson et al., 1999). The area-level models in Chapter 7 tested for the effect of location on the relationships between tenure mix and the service outcomes by controlling for density. Therefore a second set of models was run replacing the urban/rural indicator with a linear measure of density, but there were no substantial changes in the coefficients for social capital.

*Frequency of Use of Services*

The first category of outcome is Frequency of Use, where consistent indicator in the 1999-2002 data refers to Leisure Services (libraries, parks, museums, and sports). In 2009-2011, the consistent model is for Leisure Services, while we also model the frequency indicator for Necessities (post offices, banks, cash

machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, and public transport).

Neighbourhood trust and council contact have significant and positive coefficients in all three models (Table 8.3). Council contact appears to explain more of the variation compared to trust, which has very small coefficients ($b$<0.06, $p$<0.001). It is plausible that trust in neighbours is less likely to explain the frequency of using a service. In turn, frequent use of leisure services could be linked to actively wanting to improve the local area, potentially generating more council contact.

Comparing the consistent models for Leisure Services, the variation explained by both social capital predictors increases very slightly in the later period (neighbourhood trust from $b$=0.04 to 0.06, and council contact from $b$=0.28 to 0.33, all $p$<0.001, Table 8.3). This could imply that the connection between the level of social capital and Frequency of Use strengthened over time, but the increase is perhaps too small to make conclusions.

*Convenience of Essential Services*

The second outcome, Convenience, has a consistent indicator at both time periods (for post offices, banks, doctors, grocery/food shops, chemists, outpatients, and public transport). Neighbourhood trust accounts for very slight positive variation in Convenience, which is larger in the later data ($b$=0.09, $p$<0.001, Table 8.3). Council contact in turn has very small negative coefficients in both models, and only the 1999-2002 coefficient is significant ($b$=-0.03, $p$<0.05). Higher levels of neighbourhood trust may have contributed to better access to services through the assumed collective organisation mechanism, or through service providers' perceptions of an area. Lower levels of council contact might in turn imply weak collective efficacy in neighbourhoods with poorer service provision. However, the associations are suspected to partly derive from the simultaneity bias in the data. The coefficients for neighbourhood trust may reflect a correlation of individuals'

general positive outlook on neighbour relations and convenience of services at the same time.

Overall, the social capital coefficients are negligible compared to those for the SIMD and tenure clusters, and the levels of deprivation and other area characteristics continue to account for variations in Convenience as in the previous models (Chapter 7). These results imply that Convenience is explained by other factors to a larger extent than by the level of social capital in an area.

*Satisfaction with Services*

Finally, Satisfaction with Leisure Services (libraries, parks, museums, and sports) was consistent in both 1999-2002 and 2009-2011, while the latter years also include an indicator for Public Services (health, police, fire, refuse collection, schools, social care, public transport, and street cleaning). The social capital variables have very small coefficients throughout the models for Satisfaction (Table 8.3). This is expected, as it was observed previously that age and household characteristics had clearer patterns with Satisfaction compared to the area variables.

Neighbourhood trust accounts for small positive variations in the Satisfaction indicators for both time periods, having a stronger coefficient for Public Services ($b$=0.12, $p$<0.001, Table 8.3). This result is in line with the hypothesis that higher levels of community social capital allow for residents to influence service quality.

The association may also contain bias derived from unmeasured factors, so that people who engage with their neighbours tend to also be more satisfied with services. A correlation of households' economic status and location could also be contributing to a selection effect, as households with means can choose to live in areas with good services.

Council contact in turn does not explain variation in any of the models in a significant manner, except for a negligible amount for Leisure Services in the

later period (*b*=0.04, *p*<0.05, Table 8.3). Similarly to Frequency of Use, the coefficients for both social capital variables in the consistent models are stronger in the later period, the value for Council contact turning from negative to positive. However, the differences are perhaps too modest to imply any substantial change.

Table 8.3 Model results for service outcome indicators, social capital variables and area predictors. Further predictors omitted. SHS 1999-2002, 2009-2011.

| | **Frequency of Use of Leisure Services, 1999-2002** | **Frequency of Use of Leisure Services, 2009-2011** | **Frequency of Use of Necessities, 2009-2011** | **Convenience of Essential Services, 1999-2002** | **Convenience of Essential Services, 2009-2011** | **Satisfaction with Leisure Services, 1999-2002** | **Satisfaction with Leisure Services, 2009-2011** | **Satisfaction with Public Services, 2009-2011** |
|---|---|---|---|---|---|---|---|---|
| Neighbourhood trust | .0373681*** | .0579035*** | .0446417** | .0499881*** | .0949571*** | .0295091*** | .0571851*** | .125235*** |
| Council contact | .2756137*** | .3341317*** | .1844492*** | -.0309483* | -0.0036985 | -0.0236286 | .0446043* | -.0622888*** |
| OO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OO-SOC 1 | 0.0098069 | 0.0165574 | 0.0238383 | .1198615*** | .1382687** | 0.0272153 | -0.061003 | -0.0412827 |
| OO-SOC 2 | 0.0061307 | -0.0245532 | 0.049487 | .2044054*** | .1846369** | 0.0126521 | -0.0824523 | -0.0522563 |
| OO-PR | .1711536*** | 0.0376494 | -0.0971365 | .3453232*** | .3015693*** | 0.0604039 | .1535415** | -0.0060715 |
| SOC-OO | 0.0501879 | 0.1008858 | 0.0188097 | .2669274*** | .2879516*** | 0.0603342 | 0.0274445 | -0.0601587 |
| Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small towns | -.1652336*** | -0.0626741 | -0.0833749 | -.1134154*** | -0.0696722 | -.1279969*** | -0.072821 | -0.0288466 |
| Remote small | -.1910411*** | -0.0878205 | -0.0546269 | 0.0369076 | .2050448** | -0.0104219 | .1535618** | .1064155* |
| Rural | -.1950616*** | -.1538307*** | -.0691823* | -.4426271*** | -.4366084*** | 0.028741 | -0.0318629 | -.0768689** |
| SIMD quintile 1 | -.4194577*** | -.2778173*** | -0.0473591 | -.1426395** | -.2147431** | -.121554** | -0.0380333 | -0.0088783 |
| SIMD quintile 2 | -.3458305*** | -.1411748** | -0.0186945 | -.1017571** | -.1634298** | -.0755061* | 0.0322593 | 0.0054171 |
| SIMD quintile 3 | -.2313552*** | -.141691*** | -0.0393718 | -.1678889*** | -.1829079** | -0.0028355 | -0.0155206 | 0.02167 |
| SIMD quintile 4 | -.0890683* | -.1040306** | -0.0268472 | -.0666761* | -.1372304** | -0.0032375 | -0.0221655 | 0.0229597 |
| Constant | 3.420328*** | 2.185403*** | 3.580979*** | 3.977034*** | 3.61385*** | 4.111562*** | 3.821142*** | 3.397034*** |
| Level 2 variance | -1.189684*** | -1.019913*** | -1.059786*** | -1.011025*** | -.7831889*** | -1.503039*** | -1.080148*** | -1.338272*** |
| Level 1 variance | -.0235283*** | -.4127167*** | -.6666806*** | -.3479165*** | -.5790141*** | -.3739811*** | -.4631614*** | -.6289861*** |
| BIC | 37972.17 | 12532.07 | 5269.902 | 30694.17 | 6060.255 | 20974.1 | 10810.29 | 9977.539 |
| N | 13110 | 5423 | 2667 | 13147 | 2668 | 9474 | 4882 | 5417 |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

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## 8.3 Summary of the SHS social capital analysis

This section brought in two social capital variables from the SHS and modelled their relationship with the service outcomes. The variables were chosen as they represented two aspects of social capital thought to help communities to influence services, while consistency through survey periods largely affected the choice. The first variable, neighbourhood trust, was more consistent and clearly tapped into a type of social capital that has been defined as bonding capital (e.g., Putnam, 2000). The other variable, council contact, was chosen as the closest available measure for collective efficacy as individuals' willingness to influence services. However, this variable was found to be problematic, as it measured individuals' contact with the council concerning a range of issues which varied particularly in the later survey. Further, examining council contact within the tenure clusters led us to suspect that environmental problems and higher turnover contributed to higher levels of council contact in mixed inner-city areas. Therefore we are hesitant to draw conclusions about levels of collective efficacy based on the item.

Measured by the two items, social capital accounted for little variation in the service outcomes with coefficient values being modest at best. Neighbourhood trust was a positive predictor for all three service outcomes, and its coefficients were larger in the later time period for the consistent indicators of Frequency of Use and Satisfaction with Leisure Services and Convenience of Services. In turn, council contact was positively associated with the Frequency of Use indicators and negatively with Satisfaction with Public Services. However, inclusion of the social capital items did not change the substantial results from the previous analysis. Therefore, a key conclusion is that individual and household-related factors along with area deprivation explain variations in service perceptions to a greater extent compared to area social capital.

Additional uncertainty with the results stems from the key concern with this analysis. The models were likely to suffer from a bias related to unmeasured individual factors, as the social capital items are derived from the same individuals that provided the responses to the service items. The coefficients for neighbourhood trust point this out perhaps more clearly, as the likelihood

of reporting both better perceptions of services and trust in neighbours can be attributed to residents that hold a positive outlook on their local area and engage with their community. Other possible explanations for the association between neighbourhood trust and particularly Convenience include the assistance with travel or care that residents may get from their social connections making services easier to use, or that people who provide positive responses to social capital questions are people who are more present in the neighbourhood and therefore find services easier to access. Unmeasured individual characteristics may further have influenced the choice of area, contributing to a residential selection bias, as discussed in relation to the previous analyses in Chapter 7. Households that have been shown to produce higher levels of social capital tend to also hold economic positions that allow them to choose areas that have good levels of service provision. Owner-occupiers are more likely to exert this choice while also more often investing in their relations with neighbours (e.g., Völker et al., 2007; Kleinhans et al., 2007; Musterd, 2008), which the descriptive statistics also pointed to. The bias from these potential underlying factors could not be controlled for by using variables in the SHS, and will therefore be addressed by linking external measures in the next chapter.

In addition to biasing factors, simultaneous measurement of social capital and the outcomes meant that the direction of the relationship between social capital and local services remained unclear, illustrated by the association between council contact and Frequency of Use. Previous studies have found that neighbourhood facilities as public spaces can favour the production of neighbourhood social capital (e.g., Curley, 2010; Nast & Blokland, 2014). While the models found small correlations between neighbourhood trust and local service perceptions, simultaneous measurement of the two does not allow us to discern the direction of the potential causal relationship. The following section seeks to increase our understanding of the relationship between area-level social capital and perceptions of local services.

## 8.4 External estimates of social capital

The first half of this Chapter examined the relationship between social capital and outcomes for local services using SHS data alone. It concluded that the approach was not sufficient to make definite conclusions as the measures of social capital were derived from the same respondents as were providing ratings of local services, as explained in section 4.2.3. Therefore, this section brings in measures of social capital from an external survey where there are sufficient cases to make estimates of social capital for each neighbourhood. These are then attached to the SHS data through data zone identifiers. The first sections (8.4 and 8.5) detail how the social capital measures were constructed, after which regression models on the SHS data on local service outcomes are undertaken (8.6).

### 8.4.1 Methodological issues in constructing social capital estimates

The aim of this section is to describe how estimates of social capital for data zones in Greater Glasgow were obtained from the NHS Greater Glasgow and Clyde Health and Wellbeing Survey in order to attach them to the SHS data. We recognise that there are different options to build such estimates at the area level. In most cases, survey data cannot provide direct estimates for small areas since they do not have sufficient samples, leading to the use of indirect or two-stage approaches. This section first describes such an approach and outlines its limitations, after which it details how the NHS data were used to provide direct measures.

*Indirect or two-stage methods*

In trying to measure social contexts of small areas, research has to address the methodological issue of the spatial scale that relevant information is available at. This research aims to measure social capital that could be used in influencing the provision of local services in neighbourhoods. This prompts the need for estimates at the corresponding small area level, as measures of social capital derived from a larger spatial scale would obscure variation within small areas. While two scales of neighbourhood were used to model service

outcomes, we estimate social capital at the smaller data zone level, at which it is arguably more likely to present.

Previous research in the UK has struggled to produce adequate measures of social capital for small areas (see Twigg et al., 2006; Cummins et al., 2005; Stafford et al., 2003). The sample sizes of almost all (national) surveys are too small to make direct estimates of social capital for small areas, such as data zones used in this study. One approach is to indirectly estimate social capital from higher spatial scale data. Some studies have produced what they call synthetic small area estimates through a two-stage process (Twigg & Moon, 2002; Twigg et al., 2006; Mohan et al., 2005). In the first stage, questions from a national survey are taken to estimate predictors of social capital. Here, the data come from individuals but on a larger area level along with their individual characteristics. Individual characteristics thought to affect social capital, which include demographics, socio-economic categories, and household type, are included in regression models which produce the estimates. A single national model can be run assuming the same factors are associated with social capital everywhere. This yields a mean for the population and coefficients for the individual characteristics. Alternatively, multilevel models can be applied with data clustered at the regional geography level to allow for variations between regions in the predictors of social capital. Additionally, the models can allow for variations in the relationships of individual factors and region. Based on these models, probabilities of having social capital for individuals with specific characteristics and, in the multilevel case, in a specific area can be calculated.

After calculating these individual-based estimates, social capital can be estimated at the desired lower area level. Therefore, this stage requires data for the small geographical area that includes the same information for every individual within those areas as is used in the national-level model in order to first calculate the probabilities for individuals' social capital and then to apply the results for every resident within each area. To calculate the probability for each resident, the coefficients for the larger geography and individual characteristics are combined with the population mean that were all calculated using the national survey data. This gives an estimate of the

predicted behaviour for each resident at the local level based on their characteristics (ibid.).

However, this indirect method has some limitations. Importantly, the two-stage estimation method is likely to introduce errors compared to using direct survey responses from small areas. As synthetic estimates use social capital data sampled at larger geographies, the local context for social capital (i.e., individuals living in them) is defined based on national and, at best, regional-level models. Not having sufficient data at the small area level, studies assume the relationship of social capital and a predictor variable to be the same for all sub-groups (e.g., gender, ethnicity). Therefore this technique can potentially miss out local variations that are derived from their social composition. This is explicit in the study on predicting voting results by Manley et al. (2017), where local-level models showed lower support for Brexit in areas with large concentrations of minority ethnic groups, which was missed out in region-level models, as ethnic group moderated the relationship with voting Leave (ibid.).

Furthermore, the second stage has to rely on crosstabulations from Census data to apply estimates from the models to a set of individual characteristics in small areas. The first stage model therefore has to be limited to a set of variables for which there is a corresponding crosstabulation available in published local-level Census tables (or a new set of tables has to be commissioned) (see Twigg et al., 2006; Manley et al., 2017). A further limitation of missing small-area identifiers is that studies are only able to use a pre-defined scale for the neighbourhood (Twigg et al., 2006; Mohan et al., 2005).

*Direct methods*

This study is able to use a better process compared to indirect estimates, because the available data make more direct measures feasible. The NHS survey has a large enough sample size to produce estimates of social capital for small areas. Instead of calculating probabilities for individuals in smaller geographical areas from higher area-level data, this method can use the survey

responses of individuals nested in data zones. It predicts social capital using only one dataset, which was chosen partly due to its coverage of social capital for small areas.

The method used is multilevel modelling, which yields coefficients for each data zone. However, choices need to be made regarding what to include in the multilevel models to produce the best estimates. The multilevel approach allows us to obtain more accurate estimates through regression models that predict social capital scores by taking into account the grouping of responses at the area level, and possibly other explanatory variables. However, this leaves a choice between fixed and random effects. Fixed effects models account for the data zone variation by including a dummy variable for each data zone. A fixed effects model including only the data zone dummies is the 'simplest' method to average individual responses in each area at each time point. However, this assumes that the effect of area on social capital is similar across all the data zones and may omit variation within areas. In turn, random effects models allow us to account for the nesting of individuals in data zones therefore being the preferred method. We can examine the effect of the data zone variable on the outcome by allowing the effect of each data zone to vary. However, as random models assume an underlying normal distribution, they produce shrunken estimates, which reflect the number of cases in each data zone, introducing more uncertainty regarding the estimates. Both fixed and random effects models are undertaken to empirically test the best choice of model.

The second decision concerns the estimation of social capital for different points in time, as the surveys took place in different years. We would assume social capital to vary over time, leading us to use a time component in the models. The inclusion of a time coefficient is also useful in calculating the estimates more accurately for the time periods of the Scottish Household Survey, which do not perfectly match the NHS survey years. The time coefficient can be included in two ways. In both the fixed and random models, we can fit a single linear time effect, or dummy variables for time to allow a non-linear time effect. We can also add time into the random part of the model and allow its effect to vary across data zones, as we might assume the level of

social capital would not follow the same trajectory over time in all data zones. However, allowing for changes over time to vary between neighbourhoods through a random model makes more demands on the data. This has implications on the number of data zones we include in the models, as will be discussed later.

Thirdly, we might consider the use of individual predictors in multilevel models. A problem with simple area averages is that the levels of social capital may be affected by the selection of respondents in an area. So, for example if the young and old differ in their views of social capital and mostly older people happen to have been surveyed in a particular area, the area will appear to have more social capital. A related concern arises from the difference between perceptions of social capital and 'actual' social capital. The survey does not allow us to distinguish if, for example, older people actually produce more social capital, contributing to 'real' differences between areas, or whether older people merely perceive it to be higher despite the actual level of social capital being the same. If differences are perceptual, this could be addressed by removing the effect of for example age in regression models. However, this approach would also remove actual variations in social capital, as areas vary in the mix of people living in them. Therefore, we consider the best approach to be to exclude individual characteristics from the models in order to not 'distort' levels of social capital that appear in data zones.

### 8.4.2 **Choice and description of variables**

Estimates of social capital are produced using the NHS Health and Wellbeing Survey, which comprises six waves beginning in 1999. In order to obtain consistent estimates of social capital, we need the same variables in every year. The first wave does not include items that are considered key in describing social capital, and it is therefore omitted. The remaining years are 2002, 2005, 2008, 2011, and 2014.

Using multiple waves provides us with more cases and allows us to make better estimates, including ones which allow for changes over time. For the purposes of initial descriptions, the survey years are grouped into two to coincide with

the SHS data and to represent roughly the early period of New Labour and the end/after period. Table 8.4 includes the questions consistently asked in the survey that relate to the concept of social capital. The distributions are very similar across time, although there are noticeable reductions in belonging to clubs and associations and attending local clubs in the later period (Table 8.4).

Table 8.4 Percentages of positive responses in social capital variables. NHS HWB data separated into 2002-2005 and 2008-2014.

| **Social capital variables in the NHS HWB survey** | **2002-2005 (Waves 2-3)** | **2008-2014 (Waves 4-6)** |
|---|---|---|
| | **% of Sample Yes/Agree** | |
| 1. Belongs to clubs, associations | 21.5 | 12.6 |
| 2. Attends local clubs | 18.5 | 5.2 |
| 3. Has taken action to solve local problem | 9.7 | 6.6 |
| 4. Volunteers | 5.8 | 7.4 |
| 5. This is a neighbourhood where neighbours look out for each other [lookout] | 70.6 | 70.4 |
| 6. I feel I belong to this local area [belong] | 73.8 | 77.1 |
| 7. The friendships and associations I have with other people in my local area mean a lot to me [friends] | 73.0 | 72.7 |
| 8. I feel valued as a member of my community [member] | 55.6 | 60.0 |
| 9. Generally speaking, you can trust people in my local area [areatrust] | 71.3 | 71.4 |
| 10. By working together, people in my neighbourhood can influence decisions that affect my neighbourhood [influence] | 59.4 | 62.9 |
| 11. If I have a problem, there is always someone to help me [help] | 75.2 | 78.1 |
| Sample N | 22,536 | 23,012 |

For the purposes of the analysis, we want to construct a single scale indicator for social capital. Responses to questions 1-4 could be considered, as they touch on collective action that is key in influencing services. However, the percentages of respondents participating in these activities are low particularly in the later period, which would skew the model results. Responses to items 1-4 are ‘yes/no’, while statements 5-11 are measured on a 5-point Likert scale from 1 ‘strongly disagree’ to 5 ‘strongly agree’, which means that the whole set of questions cannot be combined into one scale. This leads us to consider the statements 5-11 to form a summary variable.

The statements reflect common definitions of social capital, which touch on networks, trust, and community participation (Coleman, 1988; Putnam, 2000). This approach views social capital through the benefits gained from participation in the form of cooperation and collective action. Aspects such as community membership, trust, and feelings of belonging are likely to not only facilitate participation, but also encourage investment in decisions and feelings of responsibility about the area (ibid., Perkins et al., 1996; Dekker, 2007). Therefore the choice of variables fits the notion that social capital helps neighbours to organise, solve problems and further collective issues. Further, collective efficacy is particularly reflected in item 10, 'influence over decisions that affect the neighbourhood'. All in all, these measures provide a fuller representation of social capital compared to the variables obtained through the SHS data ('neighbourhood trust' and 'council contact').

The items correlate with each other at >0.47 in both time periods (Tables 8.5, 8.6). The Cronbach's alpha of 0.9 (in both years) further confirms high internal consistency among the items. We therefore focus on items 5-11 to construct a composite variable in the next section.

Table 8.5. Social capital item correlations. NHS HWB 2002-2005. Note: *= p<0.05.

| Variables | Lookout | Belong | Friends | Member | Area trust | Influence | Help |
|---|---|---|---|---|---|---|---|
| *α*=0.9 | | | | | | | |
| Lookout | 1 | | | | | | |
| Belong | 0.6156* | 1 | | | | | |
| Friends | 0.5411* | 0.6639* | 1 | | | | |
| Member | 0.5875* | 0.6376* | 0.6491* | 1 | | | |
| Area trust | 0.6191* | 0.6432* | 0.5796* | 0.6276* | | | |
| Influence | 0.5562* | 0.5261* | 0.5102* | 0.6506* | 0.6026* | | |
| Help | 0.5229* | 0.5097* | 0.5431* | 0.4698* | 0.5208* | 0.4765* | 1 |

Table 8.6. Social capital item correlations.NHS HWB 2008-2014. Note: *= p<0.05.

| Variables | Lookout | Belong | Friends | Member | Area trust | Influence | Help |
|---|---|---|---|---|---|---|---|
| *α*=0.9 | | | | | | | |
| Lookout | 1 | | | | | | |
| Belong | 0.5675* | | | | | | |
| Friends | 0.5465* | 0.6539* | | | | | |
| Member | 0.5724* | 0.6191* | 0.6611* | | | | |
| Area trust | 0.5973* | 0.5790* | 0.5950* | 0.6295* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Influence | 0.4803* | 0.4697* | 0.5135* | 0.5727* | 0.5445* | | |
| Help | 0.5634* | 0.5852* | 0.6239* | 0.5947* | 0.6274* | 0.5527* | 1 |

### 8.4.3 **Confirmatory Factor Analysis**

This section undertakes confirmatory factor analysis (CFA) on the NHS questionnaire items 5-11, described above. CFA is very similar as a concept to principal components analysis (PCA). CFA is commonly part of structural equation modelling (SEM) and can be considered the measurement component of this, while regression considered the structural model (Harrington, 2008).

Factor models can be considered as a step in finding causal relationships. Whereas regression models consider the relationship between a predictor and an outcome, in factor analysis we suspect there to be an unmeasured confounding variable that has an effect on both. Therefore, observed variables are correlated due to this construct that is not observed in our data. Unlike PCA or exploratory factor analysis, CFA is a confirmatory method and driven by theory (Harrington, 2008). Here, we expect that the correlation among the survey items 5-11 (Table 8.4) is related to a latent variable, social capital.

A factor model is commonly represented graphically as a diagram with arrows pointing from the latent to the observed variables. A CFA is run on the pooled NHS data, in which the responses to the seven questions are measured on a Likert scale, therefore an ordinal logit link function is used. ‘Soccap’ refers to the latent variable. The diagram (Fig. 8.3.) shows the standardised factor loadings for each variable next to the arrows, the constant terms in the boxes, and the error terms for each observed variable. All variables have high loadings, which are also significant at the 0.001 level. The number 1 next to ‘lookout’ means that the regression coefficient is fixed to 1 in order to minimise the number of estimated parameters. The loadings, or coefficients, indicate that for a one-unit (1 standard deviation) increase in the latent social capital, the model predicts a 0.98 increase in for example the feeling of belonging to the area (belong) on a scale of 1-5.

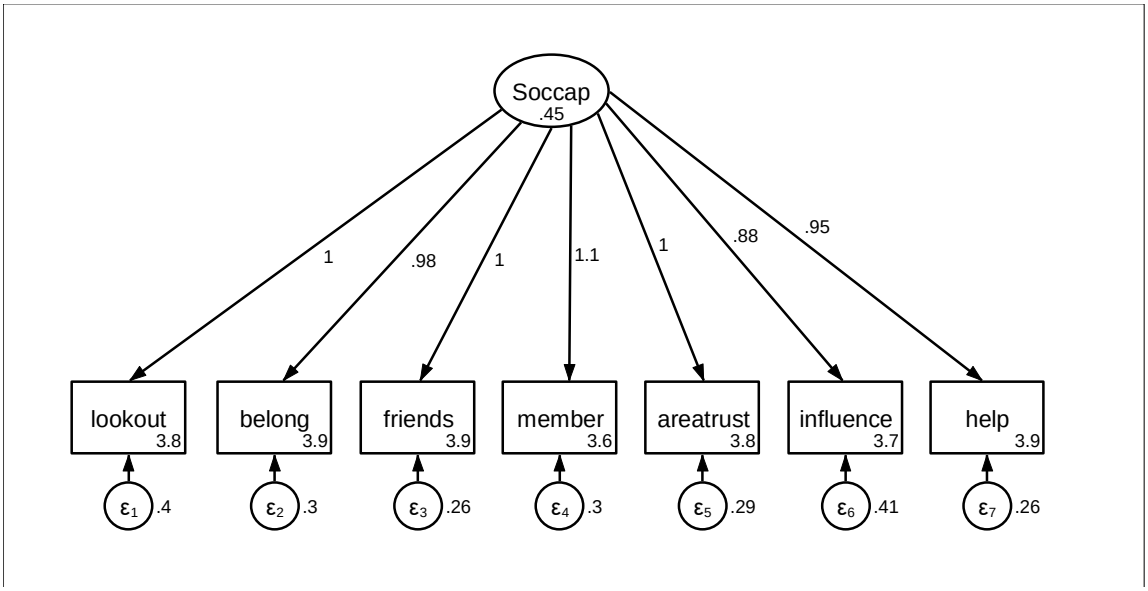



Figure 8.3 Confirmatory Factor Analysis diagram. NHS HWB 2002-2014.

The figure (8.3) is a hypothesised model tested to see how well it fits the data. The fit of the model is good, indicated by for example the Comparative Fit Index (CFI) of 0.98. A higher CFI implies better fit compared to a baseline model (Harrington, 2008). The error terms for the observed variables are >0, so the latent factor does not perfectly predict any of their scores (Fig. 8.3).

We therefore feel confident in using the seven items as the basis for a single indicator measuring social capital, which will be applied as the outcome in modelling. The resulting composite indicator is formed by taking the average of an individual's responses to the social capital items 5-11 (Table 8.4). This method ensures that the resulting value is not skewed by the missing values of respondents in any of the items. This provides a scale variable that ranges from 1 to 5, corresponding to the original scales, 5 indicating high social capital. Figure 8.4 shows that the largest number of responses are located at the higher end of the scale with a peak at 4, which could imply that a large amount of respondents have systematically chosen the response 'agree' for the statements 5-11.

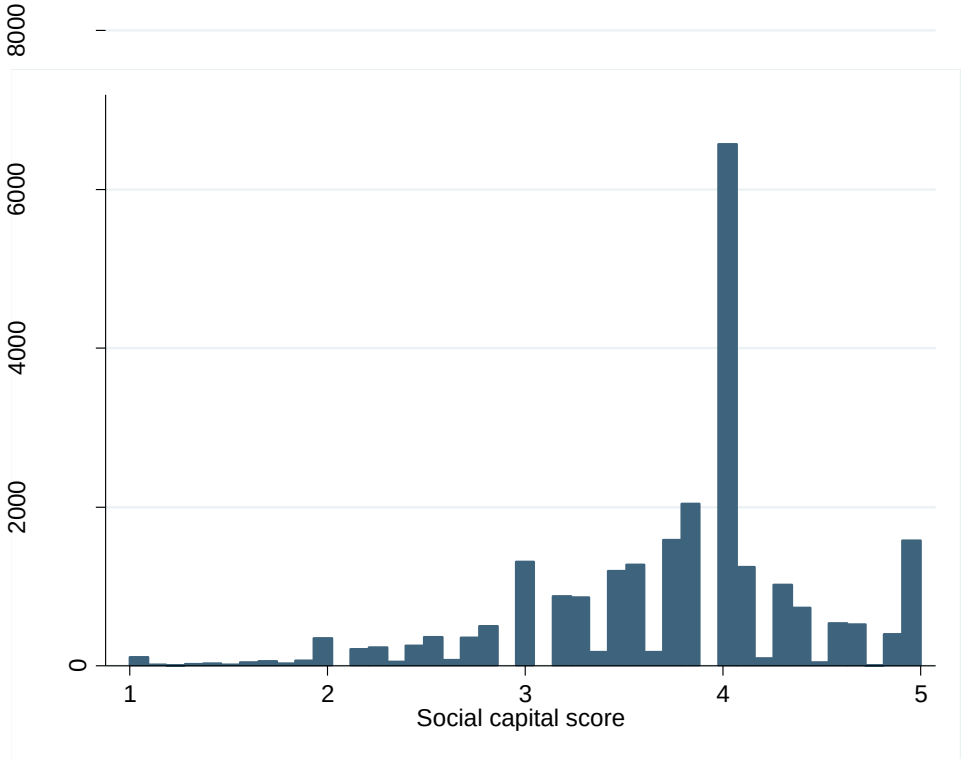



Figure 8.4. Distribution of the social capital indicator. NHS HWB 2002-2014. Note: Mean=3.78.

## 8.5 Modelling social capital in the NHS data

After identifying the latent social capital construct, this section moves on to regression models to obtain the small-area estimates. This section goes through the different options in models that we consider for creating estimates of social capital. First, a set of fixed effects models is discussed, after which random effects models are undertaken. Finally, estimates are drawn and compared from the models.

### 8.5.1 Data considerations

The models will produce estimates of the social capital score for each data zone included in the NHS sample. The aim is to estimate data zone social capital scores for the time points that are covered in the SHS data. By making estimates for the NHS survey years, we can additionally extrapolate and interpolate estimates for the SHS years (1999-2002 and 2009-2011) assuming we use a time dimension in the models. The combined survey dataset covers

1244 different data zones across the Greater Glasgow and Clyde area, which in total contains 1383 data zones in the 2001 classification. This coverage of 90% of the area is good, but a problem arises with the sampling across areas and through the years not being consistent.

The majority of the NHS data zones are sampled in two or more years. Although some data zones are not sampled on many occasions, we should be able to make time estimates for the missing years in those data zones using regression models. However, data zones with few sampling points hold implications for the inclusion of a time coefficient, i.e., fitting a straight line through the time points. We should be careful in predicting a score for a data zone that is not sampled in between the two time points, as the line drawn by the regression assumes the relationship to be linear and thereby increases the residual if the relationship is non-linear. Observing the coefficients for time shows some non-linearity with social capital, and therefore we include it as categorical in a fixed model for comparison. If we are further to estimate a time coefficient for each data zone separately through a random slope model, data zones with few sampling points should ideally be present at both time periods, as a larger time gap between samples will increase error.

Even if we do not use time in modelling, we need to ensure that all data zones have enough individual cases. A further important issue is that many areas have very few responses to the social capital items from individuals, some areas have none. Small counts may introduce error in the estimates, and therefore data zones with too few responses will have to be omitted. However, we should be careful not to omit too many and decrease the overall sample.

Table 8.7 shows the counts of data zones with up to 21 or more observations in the whole sample and at both time points in order for us to decide on a threshold that is the lowest acceptable amount of responses from a data zone. The percentages refer to the total number of data zones in the Greater Glasgow area. Even in the total sample, a threshold of 16 or more responses would only result in representing half of the data zones. Separated into the two time periods, particularly the earlier years have more data zones with few

observations, and as the number of sampled data zones is smaller, we risk losing a noticeable proportion of them.

For the fixed effects and random intercept models, we retain data zones with 10 or more responses. This gives a coverage of 75% of data zones in the pooled dataset. While for the 2002-2005 sample the coverage is only 14%, the later period covers 69% of the area's data zones. However, this is not a problem when we combine all the years and include a 'universal' time component.

We would further hope to allow for changes over time to vary between neighbourhoods, which requires using a random model with a slope for time. But to do this, data zones need to have data at more than one point, and ideally at both time periods. However, only 309 data zones are sampled at both periods at least once, and only including these would leave out the majority of data zones. Further, a threshold of 10+ leaves a too low data zone coverage for the early period (Table 8.7). Therefore we omit the random slope model and only estimate time effects through fixed and random intercept models.

Table 8.7. Number of data zones and response rates, with percentage of all data zones. NHS HWB 2002-2005, 2008-2014.

| | All years | | 2002-2005 data zones | | 2008-2014 data zones | |
|---|---|---|---|---|---|---|
| | **N data zones** | **% of all data zones** | **N data zones** | **% of all data zones** | **N data zones** | **% of all data zones** |
| Any survey | 1244 | 90 | 443 | 32 | 1111 | 80 |
| 5+ | 1182 | 85 | 309 | 22 | 1090 | 79 |
| 10+ | 1043 | 75 | 200 | 14 | 954 | 69 |
| 16+ | 695 | 50 | 42 | 3 | 565 | 41 |
| 21+ | 502 | 36 | 17 | 1 | 392 | 28 |
| All data zones in Greater Glasgow area | 1383 | | | | | |

## 8.5.2 **Fixed effects models**

*1a. Fixed effects with data zone dummies*

In the first step, we examine variation in social capital through fixed effects models (Table 8.8). Model 1a includes only dummy variables for the data zones in the fixed part of the model. This model provides a simple average estimate of social capital for each data zone. Compared to a 'null' model with no explanatory variables (omitted), the unexplained (residual) variance reduces slightly, leaving around 79% of the variance explained by individual-level factors.

*1b. Fixed effects with linear time*

The second model in Table 8.8 includes the linear coefficient for time. The NHS survey years (2002, 2005, 2008, 2011, 2014) are coded as 2 to 14 in order to include time as a linear predictor. The variance in this model does not change substantially from 1a, implying that time does not explain a great amount of the variation in social capital.

The model fit is indicated by the BIC value (Bayesian Information Criterion), and lower values imply better fit. Including time improves model fit in 1b. Further, the linear coefficient is statistically significant at the $p<0.01$ level.

This would point to a benefit in using time in social capital estimates, as the positive coefficient points to a small increase through time.

*1c. Fixed effects with categorical time*

Despite the positive linear coefficient of time, the true shape of the relationship is not clear. Therefore model 1c replaces the linear coefficient with categorical coefficients for time (Table 8.8). The relationship of time and social capital appears to 'dip' in the first two years compared to the reference and increase thereafter. A graph of the two coefficients together (Fig. 8.5) shows however that they follow a similar trend, and the linear prediction falls generally within the 95% confidence intervals of the categorical predictor. Further, the overall fit as measured by the residual variance remains virtually unchanged, so using dummies rather than one linear time coefficient does not produce sufficient gain to be justified. This implies that the trend is not too far from being linear, and we can use the linear time coefficient to predict estimates.

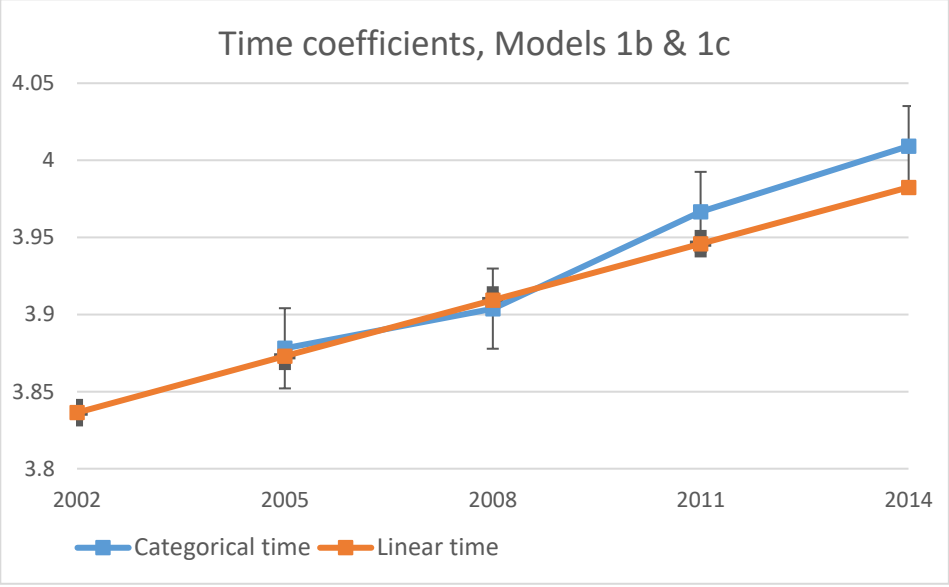



Figure 8.5 Categorical and linear coefficients for time, Fixed effects models 1b and 1c. NHS HWB 2002-2014.

Table 8.8. Results from fixed effects models 1a, 1b, 1c. NHS HWB 2002-2014.

| Fixed effects | Model 1a | Model 1b | Model 1c |
|---|---|---|---|
| Example data zone | 0.014 | 0.029 | 0.036 |
| | -0.194 | -0.194 | -0.194 |
| Linear time | | 0.012*** | |
| | | -0.002 | |
| time=2 | | | 0 |
| | | | (.) |
| time=5 | | | -0.055* |
| | | | -0.031 |
| time=8 | | | -0.029 |
| | | | -0.026 |
| time=11 | | | 0.034 |
| | | | -0.026 |
| time=14 | | | 0.076*** |
| | | | -0.026 |
| Constant | 3.924*** | 3.812*** | 3.933*** |
| | 0.109 | 0.11 | 0.111 |
| Variance (Residual) | 0.413*** | 0.412*** | 0.412*** |
| | 0.004 | 0.004 | 0.004 |
| N | 25061 | 25061 | 25061 |
| BIC | 59537.3 | 59493.16 | 59504.85 |

Note: Standard errors below the estimates. "* p<.10, ** p<.05, *** p<.01". Further data zones omitted.

### 8.5.3 **Random effects models**

*2a. Random intercept model*

The fixed effects models controlled for data zones as predictor variables, whereas random effects models account for the two-level structure of the data. First, we fit a random intercept model, which allows for each data zone to have its own intercept with level 2 specified as the data zone (Table 8.9). In Model 2a, which does not include any explanatory variables other than data zone, the variance between data zones (level 2) is 17%. The level-1 variance in turn remains similar to that in the fixed effects models (83%). As with the fixed models, this implies that differences between data zones are relatively small.

*2b. Random intercept with linear time*

Finally, Model 2b adds linear time to the random intercept model (Table 8.9). The time coefficient is the same as in the fixed models (0.01) and shows a small

positive relationship with social capital. Both the level-2 and level-1 variances have reduced by 0.001, meaning that time accounts for very little variation between and within data zones. However, as with the fixed effects model, the model fit is slightly improved and sufficient for the BIC to reduce.

Table 8.9 Results from random effects models 2a, 2b. NHS HWB 2002-2014.

| **Random effects** | **Model 2a** | **Model 2b** |
|---|---|---|
| Linear time | | 0.012*** |
| | | -0.002 |
| Constant | 3.781*** | 3.661*** |
| | -0.01 | -0.018 |
| Level 2 Variance | 0.089*** | 0.088*** |
| | -0.005 | -0.005 |
| Variance (Residual) | 0.431*** | 0.430*** |
| | -0.004 | -0.004 |
| N | 25061 | 25061 |
| BIC | 51809.83 | 51758.8 |

Note: Standard errors below the estimates. "* p<.10, ** p<.05, *** p<.01".

### 8.5.4 **Model diagnostics**

The models constructed in this section aim to predict the social capital scores of each data zone. To decide which models will provide the estimates, we look at some model diagnostics. Figure 8.6 compares the social capital estimates for each data zone from four models: the fixed models 1a and 1b and random intercept models 2a and 2b, with models 1b and 2b including time. The bars represent standard errors at 95% confidence intervals, and the data zones are ranked ascendingly by their mean of social capital. The graphs show that the estimates across the distribution of data zones are spread around the overall mean (approximately 3.8), but the estimates appear relatively concentrated as most of the error bars cover this overall mean. Therefore the estimates are not as widely spread as might be expected from a more accurate representation of all small areas.

The estimates from the random intercept Models 2a and 2b are slightly more concentrated than the fixed estimates with the scale remaining between 2 and 5 (Fig. 8.6). This is likely due to the shrinkage that occurs in random model

estimation (Snijders & Bosker, 1999). Estimates for those data zones that have smaller samples at either end of the distribution sizes have been shrunk towards the overall mean. Plotting the mean social capital score against the number of responses from each data zone (Fig. 8.7) shows that those data zones that have very few responses tend to have more extreme values, while data zones with larger samples tend towards the mean. This is a reason to carry both the estimates from 1b and 2b to the next section to empirically examine their effects.

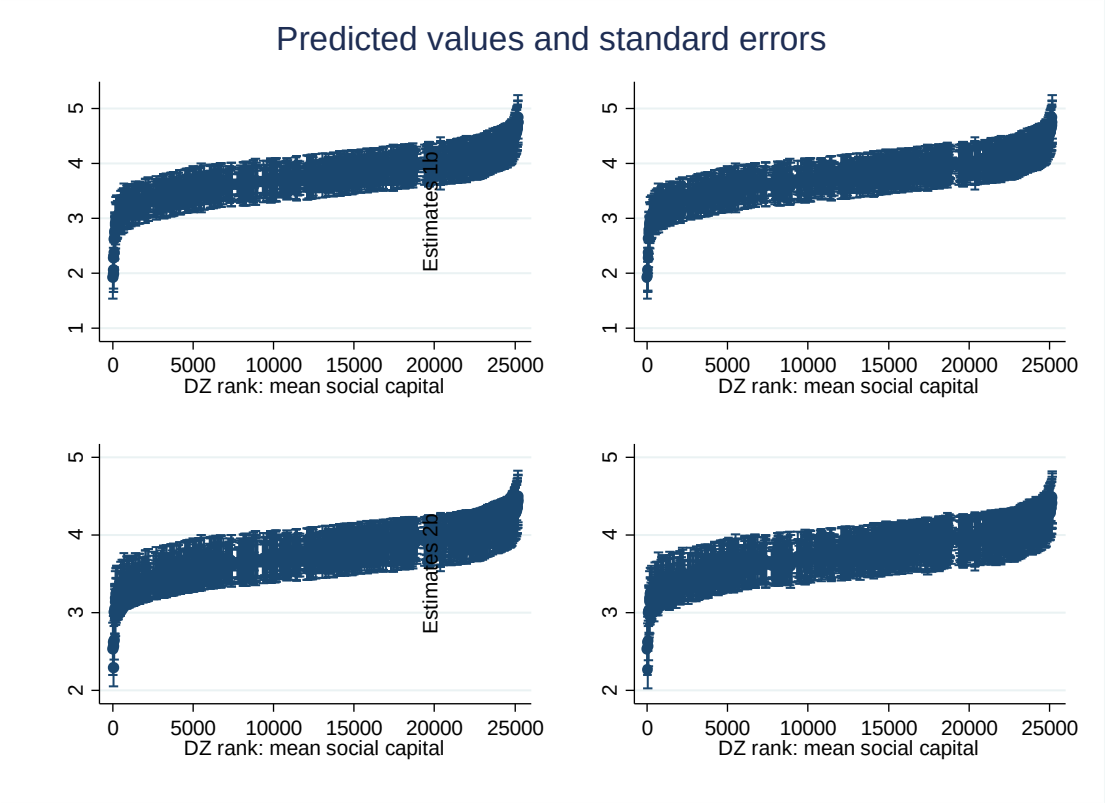



Figure 8.6. Social capital estimates and standard error bars. Ranked in ascending order of mean data zone social capital, Models 1a, 1b, 2a, 2b. NHS HWB 2002-2014.

Finally, estimates based on the model intercepts and time components are calculated for the mid-point of years 1999-2000 and 2009-2011, respectively, to coincide with the SHS datasets. The time coefficients were proved to be significantly associated with social capital, and the inclusion of the linear time component improved model fit in both the fixed and random models albeit only to a limited extent. Therefore we make the estimates based on the two models including time; fixed effects model 1b and random intercept model 2b.

Boxplots of the estimates (Fig. 8.8) show that the estimated social capital scores are very similar from both models. The fixed effects model has allowed for slightly more outlier values, while the estimates from the random model (2b) are more concentrated around the mean.

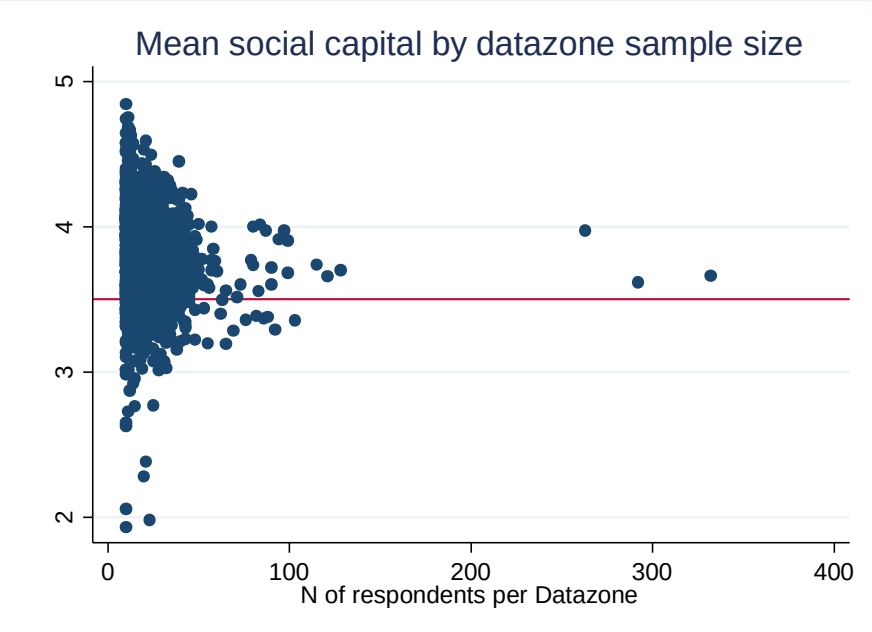



Figure 8.7. Mean data zone social capital scores against data zone sample size. NHS HWB 2002-2014.

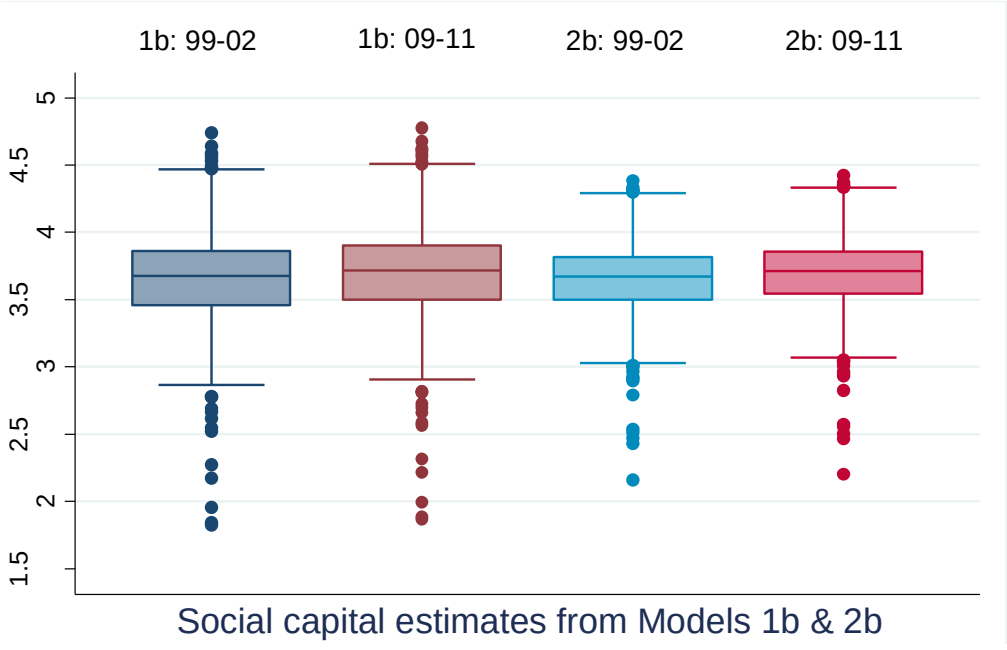



Figure 8.8. Distributions of the social capital estimates from fixed and random effects models plotted for data zones. NHS HWB 2002-2014.

The next section carries these estimates into regression models. This allows us to empirically test whether they result in different coefficients. However, the estimates from Model 2b are preferred, as the model has accounted for the two-level structure of the data, and thereby allowed for more variation between data zones.

## 8.6 Social capital estimates and local service outcomes

### 8.6.1 Comparison of social capital measures in the two surveys

The social capital estimates for data zones in the Greater Glasgow area derived from the NHS survey data are linked to the SHS dataset which also includes the tenure clusters. This results in a sample of 9327 individual observations for the first time period and 6966 in the later period, both within the 1043 data zones included in the NHS sample.

The NHS estimates could be directly linked to the SHS 1999-2002 dataset, as they both use the 2001 data zone identifiers. However, the later SHS dataset uses 2011 data zones, which the NHS does not hold. Therefore linkage to the later SHS data was done by matching the 2001 data zone identifiers of the NHS to 2011 identifiers using a Scottish Government lookup table[17] that matches the identifiers according to their best possible geographical fit. While this is the only method of linking these datasets, this has potentially brought some additional uncertainty into the modelling of the later period services. Although the tenure clusters attached to the later dataset are from the 2011 classification, this should not pose a problem as there is likely to have been very little change in the cluster assignment of data zones between the time periods.

The estimates constructed here were aimed to address the key concern with using social capital variables from the SHS, which was the potential bias from individual characteristics affecting replies to both service items and social capital. Furthermore, the social capital variables included in the SHS data

[17] https://www2.gov.scot/Topics/Statistics/sns/SNSRef/DZMatchingFile [Accessed 20/08/19]

were not considered sufficient to represent the aspects of social capital that relate to collective organisation.

Two social capital measures that were consistent over the two samples were used, and these concerned trust among neighbours and contact with the council. Neighbourhood trust asked respondents whether they would rely on friends or relatives in neighbourhood for help, to watch their home, and receive neighbour advice or support, which are similar to the items found in the NHS measure (help, trust, and friendship). Therefore we would expect them to correlate with the corresponding SHS measure, showing that the NHS estimates are a reliable representation of social capital across data zones. As shown in Table 8.10, the correlations of the NHS social capital estimates with the SHS measures are positive, albeit very low. The correlations with neighbourhood trust are significant at both time periods, but remain under 0.2.

The second item in the SHS consisted of various enquiries made to the council, not all related to collective issues. The question was considered to reflect other issues rather than collective action, such as the prevalence of environmental problems in inner cities. Furthermore, the question does not have a direct equivalent in the NHS survey. Therefore we consider the correlation with this item to be less important in assessing the accuracy of the NHS estimates. Expectedly, council contact produces very low correlation coefficients of <0.03 (Table 8.10).

The low correlations may imply that the NHS estimates do not hold a great amount of reliability in predicting data zones' social capital, or that the SHS measures do not capture social capital very well. As the questions in the two surveys do not perfectly correspond, with the NHS holding more items, very high correlations with the SHS measures could not be expected. As the SHS measure of social capital was limited to two variables, it did not provide a full description of the concept either. The two surveys can be considered to highlight social capital in slightly different ways. Therefore we consider the NHS estimates a valid alternative, as they are free from the risk of bias present in the SHS in respect to service outcomes. Outcomes based on the two different measures will further be assessed when discussing the results.

Table 8.10 Correlations of the NHS social capital estimates and SHS social capital variables. NHS HWB 2002-2014 linked to SHS 1999-2002 and 2009-2011.

| **NHS data 2002-2005** | **SHS Neighbourhood trust** | **SHS Council Contact** |
|---|---|---|
| Social capital 1b | 0.0953* | 0.0244 |
| Social capital 2b | 0.0996* | 0.0270* |
| **NHS data 2008-2014** | | |
| Social capital 1b | 0.1557* | 0.0213 |
| Social capital 2b | 0.1582* | 0.0245 |

*=p<0.05.

### 8.6.2 **The NHS estimates and tenure clusters in Glasgow**

Before modelling service outcomes, it is useful to examine how social capital varies in the different clusters for tenure based on the NHS sample. To get an overview of this, the social capital estimates are linked to the 2001 tenure clusters, as the NHS data uses 2001 data zones. Table 8.11 shows the distribution of the data zones in the NHS sample compared to the distribution of all data zones in Scotland in the 2001 Census. The 2011 clustering was virtually similar, so we do not expect the distribution in the later NHS years to have changed significantly.

In the Greater Glasgow area, 30% of the data zones fall into the majority owner cluster. Around 20% respectively fall into the remaining two owner-social rent clusters (OO-SOC 1 and 2), and the majority social rent cluster (SOC-OO). The most evenly mixed cluster, majority owner with private rent (OO-PR), comprises 9% (Table 8.11). This cluster has the lowest number of data zones in Scotland overall. The distribution of the clusters in the NHS sample has some noticeable differences compared to the Census. The majority social rent areas comprise 22% in the Greater Glasgow sample compared to 10% overall. Meanwhile, the first owner-social rent cluster comprises 19% compared to 28%. Of the local authorities included in the NHS survey, Glasgow City, North Lanarkshire, Inverclyde, and West Dunbartonshire have higher proportions of

social rented dwellings while lower owner-occupation rates compared to Scotland on average[18], and this appears to be reflected in the NHS sample.

A closer map of the clusters shows the high number of SOC-OO data zones which are mainly concentrated in Glasgow City (see Appendix A2). Particularly the OO-PR areas and some SOC-OO areas are located within the inner city, which was considered likely to influence their positive correlation with the service outcomes.

Table 8.11. Percentage of data zones in tenure clusters in NHS GGC sample and Census 2001.

| **Tenure cluster 2001** | **Description** | **% Data zones in NHS GGC sample** | **% Data zones in Scotland, Census 2001** |
|---|---|---|---|
| OO | Majority owner | 29.7 | 31.8 |
| OO-SOC 1 | Majority owner with social rent | 18.9 | 27.8 |
| OO-SOC 2 | Owner with social rent 2 | 20.5 | 23.0 |
| OO-PR | Owner with private rent | 8.7 | 7.1 |
| SOC-OO | Majority social rent with owner | 22.3 | 10.3 |

To begin to examine the distribution of social capital, Figures 8.9 and 8.10 graph the median social capital estimates from the fixed and random models (1b and 2b) for the data zones clusters. The estimates from the two models have high correlations (Pearson >0.9, $p$<0.05) at both time periods, and it is unlikely that they will produce differing results for the association with services. Therefore the next section on regression modelling only presents the models that use estimates from the preferred random model 2b.

The estimates from the two models differ very little overall, but the fixed model estimates show a larger difference particularly between the first three owner-dominated and the last two clusters (Figs. 8.9, 8.10). The estimates for

[18] https://www2.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/KeyInfoTables [Accessed 20/06/2019]

the last two clusters from model 2b are slightly higher and closer to the other clusters, reflecting the shrinkage in the random model.

The owner-dominated clusters generally have the highest median social capital scores, while the OO-PR followed by the SOC-OO cluster has the lowest scores. Differences between the clusters are statistically significant at the $p<0.05$ level with the exception of the difference between OO-PR and SOC-OO in all the estimates ($p>0.4$). This is suspected to reflect to some extent high turnover rates in areas in private and social renting, and likely to relate to the different spatial distribution of the clusters, as the two more mixed clusters are largely located in inner city areas, whereas rural and suburban areas consist mainly of the owner-dominated clusters. The scores imply that areas with more tenure mix present lower levels of social capital compared to owner-dominated areas in the sample. However, the OO-SOC 2 cluster is more mixed and has higher social capital compared to SOC-OO, implying that mixing in social housing areas may lead to higher social capital. A similar pattern with social capital was found in the SHS data, where the OO-PR and SOC-OO clusters had lower levels of neighbourhood trust compared to the clusters dominated by owner-occupation. The consistent finding from both datasets (which include neighbourhood trust) implies that they are both measuring a similar underlying concept.

The graphs (Figs. 8.9, 8.10) show small differences between the time periods, as the average estimates are lower in the later period for the owner-dominated clusters and higher for the remaining two, OO-PR and SOC-OO. The following analysis will further compare differences between the time periods as potentially influenced by New Labour's policies. The higher averages for the social rent-dominated cluster and the most evenly mixed cluster could be related to the aim to increase levels of social capital during that time period.

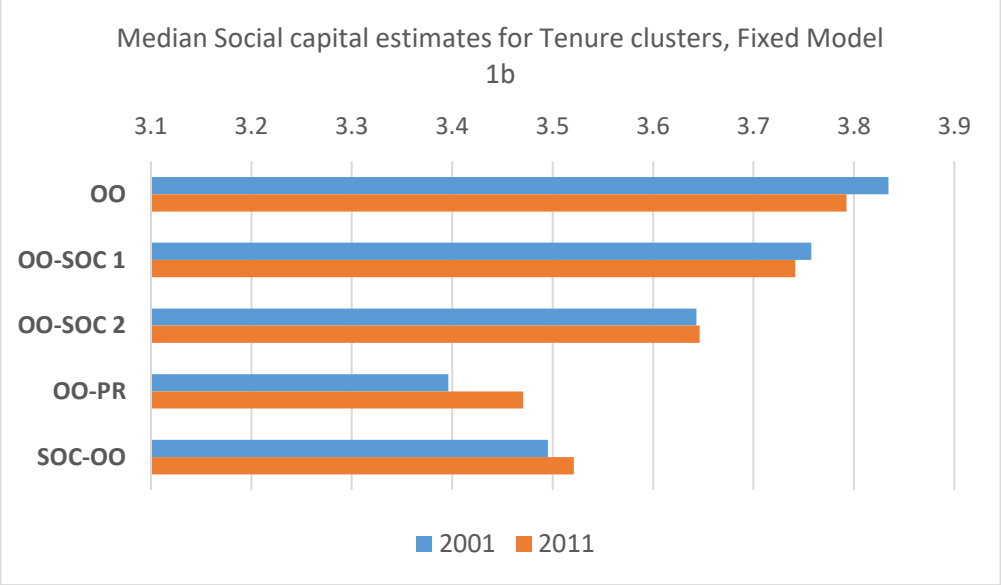



Figure 8.9. Median social capital estimates from fixed effects model 1b within the tenure clusters 2001 and 2011. NHS HWB 2002-2014.

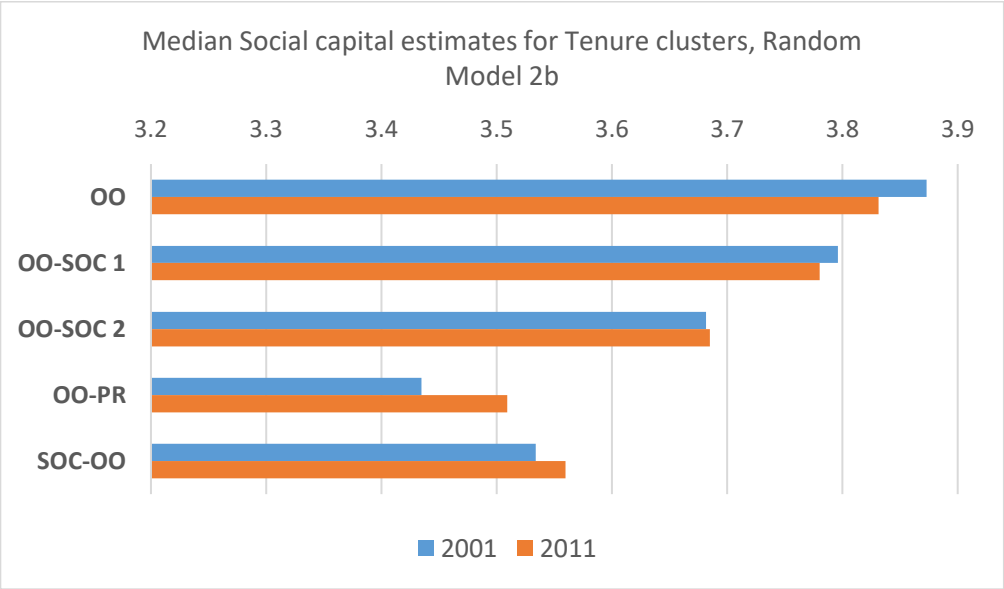



Figure 8.10 Median social capital estimates from random effects model 2b within the tenure clusters 2001 and 2011. NHS HWB 2002-2014.

### 8.6.3 Modelling the service outcomes using the external social capital estimates

As in the previous chapters, this section undertakes multilevel modelling of the service outcomes, but adding the data zone-level social capital estimates derived from the NHS survey. The modelling is done in two stages, with initial models including the social capital estimates and individual-level predictors in

order to examine the effect of social capital without controlling for other area characteristics. The full models bring in the other area-level variables: the tenure clusters, SIMD quintiles, and urban/rural categories. The inclusion of social capital does not substantially change the relationships with other predictors, so only the coefficients that we are particularly interested in are shown (social capital, tenure clusters, and the SIMD). The dependent variables are the composite indicators formed in the previous chapters for the service outcomes Frequency of Use, Convenience, and Satisfaction, modelled using linear random intercept models.

For each outcome, the two time periods of the SHS data, 1999-2002 and 2009-2011, are compared in order to examine potential changes in the relationship of services with social capital during the New Labour period. The policies of New Labour aimed to build social capital in deprived communities, which would imply that the importance of social capital in explaining outcomes should have been greater in the later period. In turn, the increased public spending and efforts to target disadvantaged neighbourhoods at the time should have contributed to more equal outcomes across areas despite the levels of social capital.

*Frequency of Use of Services*

For Frequency of Use, a consistent indicator for both time periods was formed for Leisure Services (libraries, parks, museums, and sports). The 2009-2011 data additionally had a group services named Necessities, which includes post offices, banks, cash machines, doctors, dentists, grocery/food shops, chemists, outpatients, petrol stations, and public transport.

Social capital does not account for variations in Frequency of Use of Leisure Services at either time period, nor in the use of Necessities (Tables 8.12, 8.13). The coefficients for social capital are very small and non-significant in both the household-level and the full area-level models. Areas within the mixed tenure clusters OO-PR and SOC-OO continue to report slightly higher average Frequency of leisure service use in 2009-2011, the coefficient for OO-PR being significant ($b$=0.26, $p<0.05$). However, the previously observed patterns with

age, occupation, and to some extent income and social renting hold for both service outcomes (omitted). The inclusion of social capital therefore does not change this finding from the original models without social capital, and demographic variables continue to hold greater importance in explaining variations in Frequency of Use.

*Convenience of Essential Services*

For Convenience of Essential Services, we model the consistent indicator at both time periods, which includes the following services: post offices, banks, doctors, grocery/food shops, chemists, outpatients, and public transport.

In the 1999-2002 data, the household-level model yields a significant coefficient for social capital of ($b$=-0.19, $p$<0.01), but this does not hold when the area-level variables are included (Table 8.14). Of the tenure clusters, the mixed cluster OO-PR retains a positive coefficient ($p$<0.001), as in the original models.

Coming to the 2009-2011 data, social capital accounts for moderate positive variation in Convenience both in the household and the full model (where $b$=0.12, $p$<0.05) (Table 8.14). Yet, the tenure clusters and SIMD quintiles continue to explain variation in convenience as in the original model without social capital. The OO-PR cluster has the largest positive coefficient at 0.46, while the most deprived quintile has the lowest at -0.22 (both $p$<0.005). Thus, these area predictors account for a larger share of the variation in convenience compared to social capital.

To examine which services contribute to the positive relationship in the composite model, each individual service is modelled through ordinal logistic models. Social capital accounts for noticeable positive variation in the Convenience of post offices ($b$=0.66, $p$<0.05) and banks ($b$=0.55, $p$<0.05) in the later data (tables omitted).

*Satisfaction with Services*

For Satisfaction, the consistent indicators were formed to include the same Leisure Services (libraries, parks, museums, and sports) at both time periods. The 2009-2011 data further has a group of Public Services that is modelled separately, and consists of health services, police, fire, refuse collection, schools, social care, public transport, and street cleaning.

Satisfaction with Leisure Services does not appear to be explained by the level of social capital at either time point, as the coefficient of social capital remains non-significant (Table 8.15). Satisfaction with Public Services has a small amount of variation explained by social capital in the individual-level model ($b$=0.1, $p$<0.05), but this disappears when area predictors are added. As a difference to the tenure mix models in Chapter 7, SIMD quintiles 1, 2, and 4 yield significant negative coefficients as social capital is included. This suggests that deprived areas are more likely to report dissatisfaction with Public Services when the levels of social capital across areas are considered equal.

Interestingly, respondents in the second least deprived quintile (4) are also more likely to be dissatisfied with Leisure Services in the 2009-2011 model. This may imply that areas in this quintile did not receive targeted service spending in the way that more deprived areas did. Therefore, area deprivation seems to hold greater importance in explaining variations in service satisfaction than social capital or other area variables.

Table 8.12. Models with social capital estimates for Frequency of Use of Leisure Services. Linked datasets NHS HWB 2002-2005 & SHS 1999-2002; NHS HWB 2005-2014 & SHS 2009-2011. Note: Further predictors omitted.

| | **Frequency of Use of Leisure Services, 1999-2002** | | | | **Frequency of Use of Leisure Services, 2009-2011** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Model 1** | | **Model 2** | | **Model 1** | | **Model 2** | |
| | **b** | **se** | **b** | **se** | **b** | **se** | **b** | **se** |
| Social capital | 0.0429975 | 0.0783115 | -0.0252483 | 0.0830162 | 0.043926 | 0.0547176 | 0.0001003 | 0.0571485 |
| OO | | | 0 | . | | | 0 | . |
| OO-SOC 1 | | | 0.0420808 | 0.0825692 | | | 0.0863847 | 0.0618652 |
| OO-SOC 2 | | | 0.0937885 | 0.1012021 | | | 0.1142686 | 0.0754018 |
| OO-PR | | | .257476* | 0.1067332 | | | .2271719** | 0.0742548 |
| SOC-OO | | | 0.113369 | 0.109791 | | | 0.10549 | 0.0828909 |
| SIMD quintile 1 | | | -.6038658*** | 0.108822 | | | -.3490767*** | 0.0811415 |
| SIMD quintile 2 | | | -.5885837*** | 0.1014395 | | | -.2888673*** | 0.0732228 |
| SIMD quintile 3 | | | -.4573994*** | 0.0909187 | | | -.1619795* | 0.0675272 |
| SIMD quintile 4 | | | -.3518095*** | 0.0777066 | | | -.1148437* | 0.056368 |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Constant | 3.633032*** | 0.309477 | 4.202717*** | 0.3388162 | 2.285413*** | 0.2269642 | 2.524165*** | 0.2450251 |
| Level 2 variance | -1.175282*** | 0.0956117 | -1.286056*** | 0.1117059 | -1.332055*** | 0.0790146 | -1.381072*** | 0.0839638 |
| Level 1 variance | .0478991*** | 0.0129539 | .0450917*** | 0.0129225 | -.3683427*** | 0.0149158 | -.3717363*** | 0.0148779 |
| BIC | 11920.17 | | 11918.02 | | 7590.391 | | 7618.037 | |
| N | 3888 | | 3883 | | 3318 | | 3317 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

Table 8.13. Models with NHS social capital estimates for Frequency of Use of Necessities. Linked datasets NHS HWB 2002-2005 & SHS 1999-2002; NHS HWB 2005-2014 & SHS 2009-2011. Note: Further predictors omitted.

| | **Frequency of Use of Necessities, 2009-2011** | | | |
|---|---|---|---|---|
| | **Model 1** | | **Model 2** | |
| | **b** | **se** | **b** | **se** |
| Social capital | -0.07258 | 0.051026 | -0.08413 | 0.053634 |
| OO | | | 0 | . |
| OO-SOC 1 | | | -0.00258 | 0.055756 |
| OO-SOC 2 | | | -0.10891 | 0.067722 |
| OO-PR | | | 0.00705 | 0.066437 |
| SOC-OO | | | -0.04753 | 0.074838 |
| SIMD quintile 1 | | | -0.01943 | 0.073064 |
| SIMD quintile 2 | | | 0.029294 | 0.065899 |
| SIMD quintile 3 | | | 0.007783 | 0.062074 |
| SIMD quintile 4 | | | -0.02101 | 0.052186 |
| SIMD quintile 5 | 0 | 0 | 0 | 0 |
| Constant | 4.222815*** | 0.211806 | 4.273531*** | 0.22959 |
| Level 2 variance | -1.586291*** | 0.106635 | -1.617395*** | 0.112438 |
| Level 1 variance | -.3917606*** | 0.0145 | -.3924442*** | 0.014515 |
| BIC | 7461.094 | | 7521.607 | |
| N | 3390 | | 3389 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | |

Table 8.14 Models with NHS social capital estimates for Convenience of Services. Linked datasets NHS HWB 2002-2005 & SHS 1999-2002; NHS HWB 2005-2014 & SHS 2009-2011. Note: Further predictors omitted.

| | **Convenience of Essential Services, 1999-2002** | | | | **Convenience of Essential Services, 2009-2011** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Model 1** | | **Model 2** | | **Model 1** | | **Model 2** | |
| | **b** | **se** | **b** | **se** | **b** | **se** | **b** | **se** |
| Social capital | -.1928279** | 0.0652494 | -0.037307 | 0.0690195 | 0.0310566 | 0.0529722 | .1216529* | 0.0547362 |
| OO | | | 0 | . | | | 0 | . |
| OO-SOC 1 | | | 0.0476547 | 0.0675191 | | | .1945327** | 0.059867 |
| OO-SOC 2 | | | 0.0702352 | 0.0823603 | | | .186033* | 0.0727785 |
| OO-PR | | | .3612825*** | 0.0867815 | | | .4598324*** | 0.0706683 |
| SOC-OO | | | 0.1582925 | 0.0888228 | | | .292686*** | 0.0800704 |
| SIMD quintile 1 | | | -0.0653477 | 0.0877111 | | | -.2222517** | 0.0779872 |
| SIMD quintile 2 | | | -0.0399572 | 0.0823018 | | | -0.1018127 | 0.0703579 |
| SIMD quintile 3 | | | -0.0384384 | 0.0740622 | | | -.1718855** | 0.0659526 |
| SIMD quintile 4 | | | 0.008396 | 0.063187 | | | -.1679992** | 0.0553615 |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Constant | 4.972289*** | 0.2523998 | 4.362772*** | 0.2766708 | 4.204059*** | 0.2176996 | 3.758355*** | 0.2324797 |
| Level 2 variance | -1.003784*** | 0.0472231 | -1.09032*** | 0.0522067 | -1.114383*** | 0.053166 | -1.174891*** | 0.0557489 |
| Level 1 variance | -.3581986*** | 0.0130504 | -.3567507*** | 0.01308 | -.457992*** | 0.0149278 | -.4639686*** | 0.0148161 |
| BIC | 9215.064 | | 9216.003 | | 7383.095 | | 7370.508 | |
| N | 3906 | | 3901 | | 3386 | | 3385 | |
| * p<0.05, ** p<0.01, *** p<0.001 | | | | | | | | |

Table 8.15 Models with NHS social capital estimates for Satisfaction with Services. Linked datasets NHS HWB 2002-2005 & SHS 1999-2002; NHS HWB 2005-2014 & SHS 2009-2011.Note: Further predictors omitted.

| | Satisfaction with Leisure Services, 1999-2002 | | | | Satisfaction with Leisure Services, 2009-2011 | | | | Satisfaction with Public Services, 2009-2011 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | b | se | b | se | b | se | b | se | b | se | b | se |
| Social capital | -0.0548492 | 0.0568929 | -0.0490482 | 0.0618897 | -0.05971 | 0.056586 | -0.03142 | 0.059622 | .097745* | 0.0435234 | 0.0818794 | 0.0458264 |
| OO | | | 0 | . | | | 0 | . | | | 0 | . |
| OO-SOC 1 | | | 0.0556621 | 0.0589944 | | | 0.019596 | 0.062369 | | | 0.0700985 | 0.049249 |
| OO-SOC 2 | | | 0.0987326 | 0.0747019 | | | -0.01756 | 0.076557 | | | 0.0455985 | 0.0600041 |
| OO-PR | | | 0.1174056 | 0.0764083 | | | .1874649* | 0.074424 | | | 0.0247177 | 0.0592107 |
| SOC-OO | | | 0.0596442 | 0.0818636 | | | 0.048291 | 0.084489 | | | 0.0616922 | 0.0659504 |
| SIMD quintile 1 | | | -0.0933607 | 0.0798583 | | | -0.12519 | 0.081863 | | | -.1592559* | 0.0646137 |
| SIMD quintile 2 | | | -.1527464* | 0.0734741 | | | -0.00378 | 0.073648 | | | -.1359817* | 0.0583111 |
| SIMD quintile 3 | | | -0.0324944 | 0.0640026 | | | -0.06782 | 0.067805 | | | -0.0927938 | 0.0538661 |
| SIMD quintile 4 | | | -0.0298781 | 0.0542243 | | | -.1198288* | 0.057295 | | | -.1089925* | 0.0449274 |
| SIMD quintile 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Constant | 4.321045 | 0.2277523 | 4.291232 | 0.2549675 | 4.376398 | 0.234139 | 4.27026 | 0.254984 | -.5751137 | 0.0148042 | -.5756847 | 0.0148059 |
| Level 2 variance | -2.480624 | 0.6425219 | -2.711305 | 1.009619 | -1.447996 | 0.098978 | -1.502507 | 0.108189 | 3315 | | 3314 | |
| Level 1 variance | -.2934784 | 0.015535 | -.292512 | 0.0155484 | -.3995061 | 0.016397 | -.3995996 | 0.016403 | | | | |
| BIC | 6502.451 | | 6565.517 | | 6304.034 | | 6356.499 | | | | | |
| N | 2775 | | 2771 | | 2838 | | 2838 | | | | | |
| * p<0.05, ** p<0.01, *** p<0.001 (omitted for Constant and Variances to save space). | | | | | | | | | | | | |

*Model summary*

In summary, the social capital estimates contribute little to the variation in the service outcomes. Overall, tenure mix and deprivation continued to explain service outcomes despite the inclusion of social capital. Area social capital was not significantly associated with the Frequency of Use of services, and it is plausible that use of local services relates more to need and demographic characteristics of households. This was also the case for Satisfaction with Services, i.e., perceptions of the quality of services, which remained partly explained by demographic variables, deprivation, and tenure mix. Meanwhile, Convenience of Services was found to have a small positive relationship with social capital in the later period, which held despite the inclusion of other area variables. Conclusions from this should however be made with caution, as the amount of variation explained by social capital was very small, particularly compared to the variation explained by deprivation along with tenure mix.

The outcomes were further modelled for each individual service within the three outcome categories to see whether social capital is related to any particular service. The only services where social capital accounted for some of the variation in a significant way were the Convenience of post offices and banks in 2009-2011, which is interesting in the context of branch closures that have affected the two services. Possible explanations for the results are provided in the next section (8.7).

## 8.7 Summary

This Chapter examined the contribution of social capital to the previously established outcomes in local services and thereby addressed the third research question of this study (‘*Does area social capital help to explain variations in the service outcomes?*’). The first section added two social capital variables from the SHS into the modelling of the service outcomes. As summarised in section 8.3, the SHS models showed generally small but positive associations between the local service outcomes and social capital. However, the analysis of social capital variables in the SHS suffered from the limited choice of variables and was considered to have been affected by bias. This chapter therefore focused on constructing social capital estimates based on the Health and Wellbeing Survey provided by the NHS Greater Glasgow and Clyde.

There were advantages in using both data sources. An advantage of the SHS data is that it provided a larger sample compared to the NHS, which is limited to a partial coverage of the Greater Glasgow area. It can however be argued that as the Greater Glasgow area is the largest urban area in Scotland, the results can be considered applicable to some extent in other areas.

Furthermore, the NHS data were chosen as the questionnaire items provided a fuller representation of the concept of social capital. The SHS provided two consistent measures of social capital, neighbourhood trust and council contact, which were considered to have limitations. Neighbourhood trust tapped into a bonding type of social capital as defined in the literature review (Chapter 2). While the second item concerned council contact, it was considered to reflect other aspects of neighbourhoods rather than collective efficacy. Therefore the measures did not address the type of linking social capital that is more concerned with engaging with service providers. In comparison, the NHS estimates were based on seven questions around neighbourhood social capital. While most of these would be considered to similarly represent bonding capital, a question on influencing decisions collectively tapped into the level of civic engagement and linkage to decision-makers. Therefore the NHS data allowed the analysis to improve the measurement of collective efficacy, which

represents communities ability to work together to improve services. Future research would benefit from a fuller set of variables relating to the concept of collective efficacy and 'linking capital' that takes into account the relations between communities and service providers and officials.

The multilevel modelling of the NHS estimates and the local service outcomes concluded that neighbourhood social capital contributes little to the variation in the perceptions of local services. The strongest contribution was found in relation to the Convenience of Essential Services, where the social capital estimates explained positive albeit very minor variation in in 2009-2011. Convenience was similarly associated with neighbourhood trust in the SHS data at both time periods. These findings suggest that higher levels of social capital may contribute to an area having an improved position in regard to access to services. Explanations for this result can be considered to potentially relate to the social capital mechanism, implying that residents in these areas may have been able to address the provision of services collectively, or that service providers were amenable to delivering good standards perceiving the areas as socially cohesive. Separate models found positive associations between social capital and the Convenience of banks and post offices, which can be considered likely to be affected by an economic capital mechanism, so that areas that have retained these services are host to higher levels of both income and social capital. This may again point to the selection of middle-class residents with social capital to relatively well-off areas, which was thought to influence the previous results from the SHS data.

However, despite the association between social capital and service outcomes, the patterns for demographic as well as area predictors from previous models held to a large extent. A key finding was that area deprivation continued to predict lower levels of Use, Convenience, and Satisfaction regarding local services despite controlling for social capital. The NHS models showed significantly lower average levels of Convenience as well as Frequency of Use and Satisfaction with Services for deprived areas despite the contribution of social capital, implying that geographical differences in the service outcomes prevailed.

The analysis also considered potential changes in the relationships between social capital and the outcomes through time. As the initiatives of New Labour intended to strengthen the role of social capital in empowering communities to influence services, it can be hypothesised that the importance of social capital as an explanatory factor would have increased over time. Some indication of this was provided by the stronger associations of social capital with Convenience in the later period in both the SHS and the NHS analyses, and with Satisfaction with Leisure Services (although for the NHS estimates only in the initial model).

The question of change particularly concerns areas in the lower deprivation quintiles, in line with the New Labour's policy agenda to build social capital in disadvantaged areas. As to the area types, the potential of social capital to contribute to outcomes may have been most relevant to the social-rent dominated areas (SOC-OO), more of which were likely to be resource-deprived (as described in Chapter 5). The descriptive statistics of the NHS estimates (section 8.6.1) showed slightly higher average levels of social capital for the cluster consisting of majority shares of social rent (SOC-OO) in the later period, although the difference was very small. In the 2009-2011 models, social capital was associated with higher average levels of Convenience, as was the majority social rent cluster. This may imply that the role of social capital gained importance in the later period, where it contributed to the outcome independently of area type and other control variables. However, the analysis did not focus on examining the effects of increased social capital in deprived areas through interaction terms.

The NHS results need to be compared to the results based on the Scottish Household Survey data. The SHS models found social capital measured as neighbourhood trust to generally have positive associations with the service outcomes. However, there were two major concerns with the SHS data which were considered to bias the results. These concerned the potential individual bias and selection of residents into areas, leading to positive associations between services and social capital. The inclusion of the NHS data brought value to the analysis by providing external measures of social capital, thereby separating measures of social capital and the service outcomes. The additional

data source was however not able to control for the issue of selection which may still have influenced the positive association between social capital and Convenience of Services, so that individuals with higher levels of social capital may have self-sorted into areas with good service provision.

The nearly simultaneous measurement of social capital and the outcomes also meant that the analysis was not able to distinguish whether higher levels of social capital led to better outcomes in local services later. Some evidence has suggested that local amenities in fact serve to create community networks (e.g., Curley, 2010; Pinkster, 2007; Nast & Blokland, 2014), which may also have influenced the relationship between social capital and service outcomes. Further research might investigate the association through longitudinal analysis or by timing the measures of social capital clearly prior to the service outcomes in order to begin to determine the causal direction of the relationship.

# 9 Conclusions

This Chapter provides a summary of the findings of this thesis and discusses the implications of the results. The Chapter starts by revisiting the research aims and approach and outlining how they were achieved in the analysis (section 9.1). After this, the key findings are summarised in relation to each of the three research questions in turn in section 9.2. Specific focus is provided in section 9.2.2 on the assumed mechanisms that emerged from the literature review as key rationales for using social mix as a tool to influence local service provision. The discussion assesses the findings in light of previous evidence and within the policy context around neighbourhood social mix in the time period in question. Following the key conclusions, limitations of the study approach are considered in section 9.3 along with direction for future research. The results of this study have relevance to policy that aims to address local service provision through area-based initiatives, and the Chapter lastly provides implications for policy in section 9.4.

## 9.1 Review of the research aim and approach

The overarching aim of this thesis was to investigate the relationship between tenure mix and outcomes in local services. It specifically examined small-area variations in the perceptions of local services according to tenure mix. Within this aim, the thesis set out to address three research questions:

1. Are the access to and quality of local services perceived to be better in more mixed areas?
2. Did area differences in service access and quality reduce during the New Labour period?
3. Does area social capital help to explain variations in the perceived access to and quality of local services?

Regarding the first question, the thesis discovered that residents in mixed areas were more likely to report positive perceptions of the access to and quality of local services. As for the second question, differences between areas did not reduce to a substantive degree, and there particularly remained a gap

between deprived and affluent areas. Finally, social capital contributed little to the outcomes in service perceptions.

### 9.1.1 Summary of the research aim and approach

The objectives of the thesis drew on theoretical knowledge and research evidence around mixed communities and local services. Framing the research within this background, the thesis looked at local service outcomes as a neighbourhood resource that policy aims to address through tenure mix.

Local services constitute an aspect of neighbourhoods that relates to wider inequalities in the structure of service provision, therefore providing an interesting research subject in relation to neighbourhood social mix. Furthermore, an original perspective for this thesis was given by placing the study objectives within the context of significant policy efforts to influence the provision of local services in neighbourhoods under the New Labour administrations of the late 90s and 2000s. Tenure mix policies have in the UK predominantly focused on increasing levels of homeownership in low-income areas, and it was argued that the improvement of local services has therefore relied on the positive influence of middle-class home-owners. The neighbourhood initiatives of New Labour particularly placed emphasis on the role of social capital in ameliorating outcomes, an approach that was widely criticised for overlooking structural imbalances. The thesis identified these goals within social mix policy and related them to the evidence on geographical inequalities and the middle-class advantage in service provision. This allowed the research to identify that a potential key issue within mixed communities arises as to whether possible benefits gained through middle-class social capital would be distributed to all residents. This consideration directed the choice of the outcome variables, which centred on perceptual outcomes of the access to and quality of services, and respondents' self-reported use of services. Perceptual outcomes were considered an important indicator of service users' experience, as households have different needs from local services.

To achieve the research objectives, the study used a quantitative approach to examine the association between different types of mixed area and outcomes

in the perceptions of local services. The approach allowed the study to observe patterns in the outcomes across a large sample of the Scottish population. The research objectives were addressed by linking together independent measures of the tenure composition, local services and social capital of small areas. The thesis proceeded with the objectives as follows.

**Chapters 2 and 3** reviewed literature and evidence around neighbourhoods, social mix, and local services. The review identified some of the key arguments used to justify tenure mix in policy and considered how service provision can be affected by the neighbourhood context. Within these discussions, the review identified mechanisms that could contribute to the association between tenure mix and neighbourhood services.

**Chapter 4** outlined the methodological approach and data sources used to address the research aims.

**Chapter 5** constructed a typology of neighbourhoods through cluster analysis in order to define different types of tenure mix. This allowed us to summarise the tenure composition of small areas according to the proportions of owner-occupiers, private renters, and social renters as found in Census data. The Chapter provided a description of the types of Scottish small areas with different levels of tenure mix. These tenure clusters were linked to the data on local services in subsequent analyses in order to begin to answer the question of which type of mix would be associated with better outcomes

**Chapter 6** described the outcomes in the study, which concerned the Frequency of Use, Convenience, and Satisfaction with local services. The Chapter undertook initial regression analyses of the outcomes through individual and household predictors, which allowed us to identify patterns in the outcomes.

**Chapter 7** undertook multilevel modelling of outcomes in local service perceptions to address the first and second research questions. The area-level modelling focused on the associations between varying types of tenure mix and the outcomes as well as area deprivation to address the first research question on area differences. This analysis also examined potential changes in the

outcomes over time in order to answer the second research question on change over time. The research question was addressed by comparing results for three outcome indicators (Frequency of Use of Leisure Services, Convenience of Services, and Satisfaction with Leisure Services) at two time periods corresponding to the early and late years of the New Labour government.

**Chapter 8** addressed the third research question through two separate analyses to provide more reliable results. First, measures of social capital were identified in the Scottish Household Survey data and included in the modelling of the service outcomes. This analysis was considered to be affected by bias from unmeasured characteristics of the respondents, as measures of social capital were simultaneous to the service perceptions. Therefore, the Chapter constructed independent small-area estimates of social capital using data from the NHS Health and Wellbeing Survey in order to produce measures that were external to the SHS data. The NHS estimates were linked to the SHS datasets and the tenure clusters.

## 9.2 Key findings and contributions

### 9.2.1 The relationship between tenure mix and local service outcomes

The first Research Question asked: *Are the access to and quality of local services perceived to be better in more mixed areas?*

The study found that residents in some mixed areas were more likely to report positive perceptions of the access to and quality of local services. This conclusion held after controlling for the impact of intervening characteristics of individuals and their local areas, which included information on individuals' demographic profile, housing, as well as categories of area deprivation and urbanity.

The analysis focused on examining the relationships between types of tenure mix and the service outcomes with the aim to enquire whether a specific type of mix would promote positive outcomes in residents' perceptions of local services. This was addressed by defining types of tenure mix through cluster analysis and consequently including these tenure clusters in multilevel models.

This approach added to previous knowledge in the field that has assessed outcomes for different mixed areas, allowing the study to examine the question of what type of mix would be appropriate to achieve outcomes. The analysis focused on data zones, which were grouped according to five types of tenure mix. It was found that the most evenly mixed area type that consisted of nearly even proportions of owner-occupation and private rent, along with some social rent, named 'owners mixed with private rent' (OO-PR), contributed to positive variation in a majority of the outcome indicators. Residents from these types of areas were more likely to report higher levels of convenience in regard to essential services and higher levels of satisfaction with leisure services. Residents in these areas tended to also use local services more frequently.

In particular, the results showed that residents in mixed areas report their perceptions of access to services as better compared to non-mixed areas. This result was consistent for all the mixed area types, which were positively associated with Convenience of Essential Services compared to the area type that consisted of large majorities of owner-occupiers. In turn, only the most evenly mixed area type (OO-PR) contributed consistently to positive outcomes in the two other outcomes, Frequency of Use and Satisfaction with Leisure Services. The levels of use and satisfaction were explained by individuals' demographic characteristics, particularly age and household composition to a larger extent than by tenure mix.

The analysis addressed the issue of scale as potential factor influencing results by modelling key outcomes at two area levels. Chapter 7 repeated the initial modelling using a larger definition of neighbourhood, as the organisation of many public and private services takes place at a higher area level. Intermediate areas were used to define the grouping of responses, with corresponding cluster analysis of intermediate area Census data providing four tenure clusters for the models. Most of the lower-level associations for the types of tenure mix and service outcomes held at the intermediate level, and the relationships between all area types and Convenience of Services remained significant. The strong pattern for the most evenly mixed area type (OO-PR) remained as the cluster explained positive variations in most outcomes.

A further interesting finding was that the mixed area type consisting of a large social rented sector, SOC-OO, was positively associated with Convenience at two area levels. It further held positive relationships with a larger number of outcomes compared to the two clusters consisting of owners mixed with social rent (OO-SOC 1 and 2) in the data zone models. Contrary to the arguments for introducing mix in mono-tenure social housing areas, these findings imply that areas consisting of relatively large social rented sectors can provide services suited to the needs and priorities of residents, suggesting that it is unclear whether introducing higher levels of owner-occupation to these areas aid service outcomes.

The strong association of tenure mix with access to services (Convenience) led the analysis to enquire whether the relationship was explained by the location of these types of areas in relation to services. This was particularly pertinent to the association with the OO-PR-type areas that consist of large shares of private renting, which is more prominent in urban areas. The map of the data zone tenure clusters (Appendix A1) showed that areas in the most mixed cluster, OO-PR, are largely located within cities and nearby inner-city areas, while remote areas tend to belong to the majority-owner area type (OO). Therefore it is plausible that the comparatively positive reports of access to services in high-mix areas would result from households' proximity to services in urban areas. In order to account for the location of mixed data zones, the models were adjusted for population density as a proxy for distance to inner city areas. As density was included, the most mixed area type (OO-PR) retained its positive associations with the outcomes, while all area types also continued to account for positive variation in the Convenience of Services. This suggested that mixed tenure may increase the likelihood of reporting services as convenient independently of the location of areas in relation to inner cities. However, this could alternatively be explained by the reference group, majority-owner (OO) areas, being provided with fewer nearby services due to lower levels of need.

Tenure mix has previously been linked to improvements in local amenities (Jupp, 1999; Kearns & Mason, 2007; Kearns et al., 2013; Page & Broughton, 1997; Atkinson & Kintrea, 1998) with varying explanations provided for the mechanism of how tenure mix influenced services. A case study in Glasgow for

example attributed improvements in local amenities stemming from large public and private investment in the areas, where tenure mix was found to increase confidence for investment (Kearns et al., 2013). While this study was not able to relate qualitative assessments to the results, it explicitly addressed two possible mechanisms behind outcomes, as discussed next.

### 9.2.2 Mechanisms of social mix

The literature review (Chapters 2 and 3) recognised that the assumptions behind the impact of social mix on local service provision have largely relied on the positive influence of owner-occupiers. The following mechanisms were identified as the central arguments for the benefits of mixed tenure:

- Economic capital: the higher income levels of middle-class residents are likely to help sustain local businesses and private services.
- Cultural capital: services in mixed neighbourhoods can benefit from the cultural of middle-class home-owners, which allow them to engage with service providers and local authority officials and exert demand and pressure towards them.
- Social capital: owner-occupiers encourage collective efficacy in mixed neighbourhoods by increasing levels of social capital and being active in collective organisations to help communities to influence service provision.

The modelling in Chapter 7 allowed the study to explore the first mechanism referring to aggregate economic demand. The assumption behind the economic capital argument is that areas with larger shares of higher-income households would be better able to sustain high levels of private service provision.

A set of models was carried out on the service outcome indicators examining the impact of average area-level income as represented by area deprivation separately from individual income levels. Deprivation as a measure of average area income can be seen to represent collective economic capital that can have spillover effects for all residents in the area. The models showed deprivation to hold strong patterns in the service outcomes, so that respondents from more deprived quintiles were less likely to report more frequent use of Leisure Services, Convenience of Essential Services, and

Satisfaction with Leisure Services, albeit the latter two to a lesser extent. The gradient across deprivation quintiles in most outcomes further implied that outcomes decline with higher levels of deprivation. Therefore, as average income levels rise, outcomes for areas tend to improve, which lends support to the argument that an economic capital mechanism measured as collective income levels can help to support local services.

Some reservations should however be held when interpreting the results in regard to an economic capital mechanism. The effect of average area income cannot be fully claimed to represent an economic capital mechanism through social mix, as average income levels only capture some of the effect of mixing. Areas with mixed tenure compositions differ in their levels of affluence, the association of mix and income therefore being non-linear. Areas that are at the low end of the income distribution but contain socio-economic mix have higher average income levels than non-mixed low-income areas. Therefore introducing mix in very poor areas by default increases the average income level, but it does not necessarily increase spending power if households who move in are not very affluent. Tenure mix predicted levels of service use despite controlling for individuals' income in the models (Chapter 7), which further implied that tenure mix is an independent measure in relation to levels of individual income. It was not in the scope of this study to investigate the impact of mixed areas at different points of the income distribution.

The effectiveness of the economic capital mechanism is further questioned by the consistent finding of previous studies that more affluent households access many services outside their local area (e.g., Atkinson & Kintrea, 2000). This finding provides perhaps the most pertinent argument undermining assumptions about the effectiveness of the economic capital mechanism. This study was further not able to assert whether respondents accessed services locally, as the survey question on the Frequency of Use was not defined in relation to services in the local area. The more frequent use of Leisure Services of higher-income groups may have particularly indicated that these groups access services in wider areas, as these facilities are more sparsely distributed. As for the remaining two outcomes, the analysis suggested that perceptions of access to and quality of services were not associated with individual income, which may derive from higher levels of mobility and increased choice among

high-resource groups. This may further go against the argument that the presence of higher-income groups in mixed areas could help to support services locally.

An aspect that further undermines the potential of individual economic demand to benefit local services is that income groups differ in their patterns of use in regard to types of services. Chapter 7 looked at the service outcomes separately for specific services, controlling for household and area predictors. These models showed that individuals with higher incomes were more frequent users of cultural amenities (museums, theatres/concert halls) and sports facilities, which can be attributed to the higher levels of economic and cultural capital of middle-class households. This finding is consistent with other survey reports (Bramley & Besemer, 2011; 2016; 2018). Higher income was also associated with more frequent use of some essential services (Necessities): cash machines, dentists, and petrol stations, but not with the use of banks, food shops, or chemists, which households with more limited resources and lower levels of mobility might particularly require access to locally. The use of petrol stations also stems from higher-income households being more car-reliant which increases their flexibility in accessing services further afield. The differences in patterns of use between income groups imply that households with more economic capital may not bring in additional demand for some of the services that can be considered essential for households on lower incomes. This further supports the claim that increasing the presence of more affluent households in an area is not necessarily a solution to improve essential service provision in low-income areas.

This study was not able to explicitly test the second assumed mechanism for the influence of social mix on local services, which concerns middle-class cultural capital and engagement with services. As discussed in the literature review (Chapters 2 and 3), evidence has emerged on middle-class residents' ability to put pressure and demand higher levels of performance from local service providers, who also tend to be more responsive to middle-class dispositions and demands. As a result, middle-class households tend to have an advantage over service provision and capture more of service expenditure (e.g., Hastings et al., 2014; Goodin & LeGrand, 1987), which was partly evidenced in this study by the higher levels of service use attributed to high-

income individuals. While the study was not able to incorporate variables concerning middle-class influence, the cultural capital mechanism may be one potential factor driving the outcomes in this study, particularly the outcomes in service satisfaction.

The analysis found the most evenly mixed area type (OO-PR) to consistently predict higher levels of satisfaction, while the two mixed but owner-dominated clusters (OO-SOC 1 and 2) did not hold significant associations with Satisfaction when density was controlled for. This suggested that increased levels of owner-occupation in mixed areas did not contribute to improvements in service quality compared to the default majority-owner cluster (OO). A partial explanation for this could be related to higher expectations for services from owner-occupiers and higher-income groups leading to lower levels of satisfaction, which previous studies have observed (e.g., Duffy, 2000; Hastings, 2009b; Clark & Kearns, 2017). In turn, the positive findings for the OO-PR cluster could imply that higher levels of private renting as an element of mix contribute to improved levels of service quality. The findings point to considering the potential of private renters' cultural capital as a driver of service improvements, as the group comprises large numbers of young and relatively mobile households.

Nevertheless, the somewhat different patterns of service use across income groups can question the potential of a cultural capital mechanism. As higher-income households are likely to access many essential services outwith their neighbourhood, it can be questioned whether middle-class residents' cultural capital would address to influence services these groups do not rely on in the local area. In fact, there is no clear evidence to date on whether the impact of middle-classes through their cultural demand benefits services for all residents (as mentioned by Hastings & Matthews, 2011), while evidence on local economic demand is inconclusive. Further research on the impact of mix on local services could therefore specifically address the class-based demand mechanism. The third mechanism was tested in separate analysis of the contribution of social capital to the outcomes, as discussed in 9.2.4.

### 9.2.3 Change over time

The second research objective concerned potential changes over time in the outcomes for local services in order to investigate possible impacts of policy initiatives carried out by the New Labour government. The research question was: *Did area differences in service access and quality reduce during the New Labour period?*

Social mix featured strongly in the neighbourhood initiatives of New Labour (1997-2010), as a policy tool to improve outcomes for low-income areas. In addition, increases in public spending during the time and the integration of the neighbourhood in mainstream policies was expected to result in improved service outputs in disadvantaged areas. The question therefore relates to the change for different types of mixed area and areas with higher levels of deprivation.

The multilevel models provided indication that differences between areas may have narrowed to some extent, although differences between the time periods in regard to tenure mix were not considered substantive. The modelling of the outcomes for mixed areas in Chapter 7 implied that the association between tenure mix and Convenience of Essential Services weakened between the years when population density was additionally controlled for. The types of tenure mix showed weaker positive associations with the outcome in 2009-2011, with the exception of one area type consisting of a majority of owners mixed with social rent (OO-SOC 1). Furthermore, area differences in Satisfaction with Leisure Services diminished for the OO-SOC 1 and SOC-OO (majority social rent) clusters in the later period, where only one cluster (OO-PR) was significantly different. The models therefore indicate that the importance of social mix in explaining outcomes was weaker in the later period, and the results can be regarded as a slight levelling of differences in the perceived access to and quality of services between area types.

Secondly, the question of change over time concerns deprivation. The SIMD quintiles held fewer significant coefficients in the later models for Convenience of Services and Satisfaction with Leisure Services, which implies that area

differences may have slightly narrowed and deprivation levels explained perceptions of access to and quality of services to a lesser extent.

Nevertheless, an important finding was that the difference between deprived and affluent areas persisted in most outcomes, and perceptions of the access to and quality of local services were found to be consistently lower in more deprived areas.

The argument for potential change in outcome requires consideration on changes in the sizes of areas that were owner-dominated, mixed, or social-rent dominated, as this could be an indication of the effectiveness of New Labour's neighbourhood initiatives to promote mix and owner-occupation. The number of households in the owner-dominated clusters was higher in 2009-2011 compared to 1999-2002, while in the most evenly mixed (OO-PR) areas, numbers increased due to increases in private renting during the time. In turn, there was a small reduction in the number of households in the social-rent dominated areas, which were also more likely to be resource-deprived. These changes imply that the policies were successful in increasing the number of households in owner-occupation while decreasing concentrations of social rented dwellings. Further, the change can be regarded as positive as more households lived in mixed areas which were at least anticipated to provide better services.

The weakening of the differences between area types in terms of mix and deprivation can be related to New Labour's policy efforts to increase social mix and redistribute resources to public services. However, it should be noted that the study approach does not allow us to attribute changes in outcomes directly to New Labour's policies, as it did not control for all possible intervening factors in a more comprehensive manner.

### 9.2.4 **Social capital**

The third research objective was to examine the contribution of social capital to the outcomes in local services with the Research Question, '*Does area social capital help to explain variations in the service outcomes?*'. This question

pertains to the third assumed mechanism behind mix interventions (discussed in section 9.2.2).

The question was approached through two separate analyses in Chapter 8. First, social capital variables from the Scottish Household Survey were included into the modelling of the service outcomes. However, this analysis was considered to be affected by bias from potential unmeasured individual factors related to both social capital and service perceptions. This prompted the Chapter to construct external estimates of area social capital to address this bias drawing on data from the NHS Greater Glasgow and Clyde Health and Wellbeing Survey. The NHS data was considered to provide a fuller set of variables around social capital, pertaining to neighbour relations, community participation, and perceptions of the ability to influence services. The careful construction of social capital estimates for small areas further forms a key contribution of the thesis as a direct method of deriving small-area estimates directly from individual survey responses.

The multilevel analysis of both data sources pointed to the conclusion that area social capital contributed to minor variations in the local service outcomes that were unlikely substantive. Importantly, the inclusion of social capital did not diminish the previously established associations for individual and area-level predictors. While the contribution of social capital to the service outcomes was considered to be small in both datasets, social capital held positive associations with the Convenience of Essential Services in 2009-2011 in both analyses. Further, examining the SHS data showed higher levels of neighbourhood trust to be associated with small positive variation in Convenience and Satisfaction with Leisure and Public Services.

The evidence therefore implies that areas with higher levels of social capital may have contributed to improved service access and quality. It is possible to consider that social capital could influence the service outcomes indirectly through service providers' perceptions of the area as socially cohesive, making them more inclined to maintain service standards and respond to residents' demands in those areas. However, it was suggested that the association of social capital with the service outcomes in the SHS may also be derived from the presence of social connections in the area that can aid residents to access

services. The SHS results were likely subject to a selection bias, as for example individuals who provided positive responses to social capital questions may have in general held a more positive outlook of the neighbourhood.

While the independent area estimates from the NHS survey aimed to correct this bias, social capital continued to be a significant predictor for the Convenience of Services. A potential selection effect could still be thought to influence the association of social capital with perceived access to services, as neighbourhoods that are well positioned within urban areas are more likely to comprise residents with resources and higher levels of these types of social capital. The study was therefore hesitant to attribute a causal link to this association. An important finding in the analysis of both datasets was that demographic variables and particularly area deprivation consistently explained outcomes despite levels of social capital.

The study also aimed to provide insight into the discussion on the prominence of social capital as part of New Labour's social mix policies and therefore explored the change in the effect of social capital between the time periods. The policy discourse of New Labour further assumed social mix to increase levels of social capital, which would allow residents to organise collectively to influence local services (Docherty et al., 2003; Hastings, 2003). The policies particularly aimed to strengthen social capital in more deprived areas that had less socio-economic mix and often very little tenure mix. Following this, the study hypothesised that deprived areas should have gained social capital between the study years, and that the contribution of social capital to the outcomes increased over time. This hypothesis therefore pertains to the area measures of deprivation and tenure mix, and particularly the type of mixed area that consists of a majority of social rent (SOC-OO), which comprises a higher number of deprived areas.

In regard to the different types of mixed area, evidence in Chapter 8 showed minor differences in the average levels of social capital (as measured by the NHS estimates) between the years. However, the descriptive summaries showed that levels of social capital were slightly higher in 2009-2011 compared to 1999-2002 in the majority social rent cluster and the most evenly mixed cluster consisting of owners mixed with private rent. In addition, models on

both the SHS data and the NHS social capital estimates pointed to the contribution of social capital being more important in the later period, where social capital predicted higher average levels of Convenience of Services. This lends some support to the hypothesis that social capital gained importance in explaining outcomes during the time period.

However, it is unlikely that a social capital mechanism significantly improved service outcomes for social rent-dominated and deprived areas. In the 2009-2011 model including the social capital estimates, the majority social rent cluster (along with other mixed areas) was associated with positive outcomes in Convenience. This implies that while social capital may have contributed to better perceptions of access to services, the situation in social rent-dominated and mixed areas is not fully explained by levels of social capital. Further, the models strongly suggest that the access to and quality of services remained poorer in deprived areas despite the policy intention to increase social capital in low-income areas during the New Labour era.

The analysis on social capital opens some potential avenues for further research. As discussed, the literature on social mix has remained inconclusive as to whether mixing tenures and socio-economic groups achieves positive outcomes through social capital. Increases in the number of owner-occupiers may enhance average levels of social capital through their participation in the community, but it is not clear whether their presence helps existing residents build social networks and encourage other residents to take part in collective action that could influence service provision. Furthermore, policy discussions have focused on promoting the 'bridging' type of social capital in disadvantaged areas, which refers to participation in community organisations and is more prevalent among higher-income groups. The literature however pointed out that bridging capital should not be equated with linking capital, which is required to create relationships with officials such as service providers (e.g., Purdue, 2001). Therefore only relying on community participation as the basis for collective influence lacks recognition that communities also need to be able to access decision-making processes and persons in positions of power. Future research might aim to assess the potential of communities to influence on local services by including measures pertaining to communities' linking capital.

## 9.3 Limitations and future research directions

After discussing the results, some implications for future research can be drawn from the limitations of this study. An important limitation arose from the use of cross-sectional data, which limited the ability of the study to discuss causality in the relationships between tenure mix, social capital, and service perceptions. The nature of the data meant that the analysis was not able to control for possible selection effects, whereby residents may have self-selected into areas with good service provision, contributing to the association of tenure mix with more positive service perceptions and possibly also social capital and services. Therefore further research would benefit from rich longitudinal datasets pertaining to individuals' perceptions of local services and incorporating information on their mobility.

The analysis using social capital estimates was limited to the Greater Glasgow and Clyde area, due to the NHS survey being conducted in the region. While the survey provided a relatively large sample over time, this was likely to limit the generalisability of the results to other small areas. In addition, analysis on the contribution of social capital to service outcomes through both the SHS and the NHS data pointed to a need for fuller sets of variables relating to the concept of collective efficacy. The influence of collective action through local organisations on the provision of services was identified as a central policy approach, but remains somewhat under-researched through quantitative measures.

Further research into the relationship between social mix and local services could benefit from qualitative and case-specific approaches. By using a quantitative approach, this study was not able to enquire into the motivations of respondents in mixed areas for reporting more positive views of services. Approaching this question through interviews might allow for research to establish which elements residents in mixed areas consider to be beneficial for service provision, and how social mix might improve communities' ability to collectively influence services. As discussed, the study remains without a definitive conclusion about the impact of a potential cultural capital mechanism driving improvements in service provision as a result of increases in the shares of middle-class residents, which a qualitative approach would be

better positioned to investigate. Furthermore, the study did not distinguish how changes in the tenure composition of small areas came about and what impact it might have had on the level of services. This may be a further important aspect to consider, as some evidence suggests low-income areas risk losing additional funding for services as a result of change in the population make-up.

Finally, a clear direction for future research would be to follow trends in the service outcomes during the austerity period, which has contracted funding for many services and continued to devolve powers. This study was able to make suggestions about the impacts of funding expansion in the New Labour period, but it can only speculate that the current period produces reverse effects.

## 9.4 **Policy implications**

Finally, this thesis bears some implications for policy based on the findings discussed in this Chapter. Tenure mix has been widely adopted as a policy tool in developing areas that are better able to sustain local services partly through the economic demand created by higher-income residents. The overall implication of this study is that while mixed areas tend to be associated with better outcomes for services, policy should exercise caution in the application of tenure mix as a tool to address structural imbalances in service provision and carefully assess the expected impacts of mixing.

The results lend some support to the policy practice of implementing tenure mix through the finding that residents in most mixed area types reported improved access to and quality of services, compared to non-mixed areas. Based on the finding that areas with higher average income levels are associated with positive outcomes, this study lends support to the benefits of collective economic demand on local services through mixing. Nevertheless, this study was not able to assert whether service outcomes improved as a direct result of increased levels of economic capital, or for example as part of larger investment into areas from public and private actors through regeneration. The results should further be interpreted with caution in regard to applying tenure mix in social rent-dominated areas. Notably, the findings suggested unclear benefits from introducing higher levels of owner-occupation to social housing

areas, which showed better outcomes compared to areas consisting of large owner-majorities. Therefore evidence from this study does not imply that mixing should be implemented in social housing areas to improve service outcomes.

In fact, the study found more deprived areas to have consistently worse outcomes, implying a need for more concentrated efforts in resource-deprived areas. Therefore it is not recommended that tenure mix policies merely rely on the potential of higher-income households to create economic demand for services in local areas and expect mix to act as a substitute for the redistribution of local government funding. Further, the study did not find mixing to aid outcomes in public services, implying that tenure mix should not be expected to effectively influence the provision a number of services that are delivered on a universal basis by councils and local authorities.

This study also concluded that greater economic capital generated through the inclusion of higher-income residents may not be directed to services in local areas, in line with the well-established finding that higher-income households tend to access many services outside their local area. This thesis further considered an underlying assumption of social mix policies to have centred on middle-class home-owners' cultural competency in influencing service provision and engaging with service providers. Further considering the above mentioned findings of this study, it can be argued that more affluent residents might be less inclined to influence services they do not rely on in the local area, and the analysis did not find most mixed areas to predict higher levels of satisfaction with services.

This study further concurred with previous research that the patterns of service use of higher-income households and their needs somewhat differ from those of low-income households, who are more reliant on locally provided public services (e.g., Bramley & Besemer, 2016). Therefore social mix policies that introduce home-owners into low-income areas should not expect potential citizen influence on service provision asserted by predominantly middle-class groups to correspond to the needs residents on lower incomes. Area-based policies that address local service provision should consider what type of services mixing will help to sustain, if any, and which user groups will be the

beneficiaries. This should involve a realistic assessment of the needs of different resident groups to access services locally. Particularly, mix initiatives that introduce a large number of higher-income households into low-income areas should work to protect services that are used by low-income and vulnerable groups.

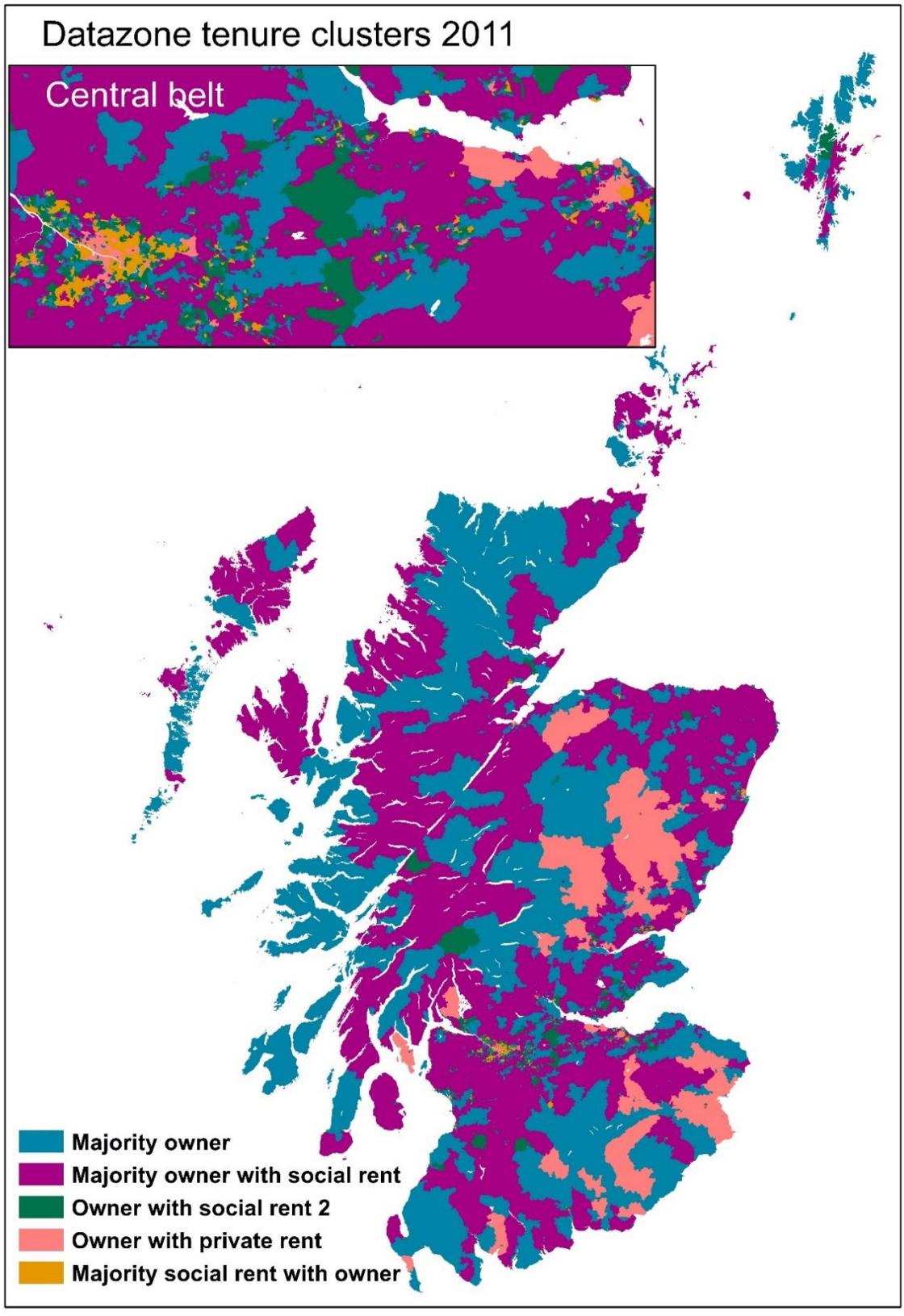
The study was further able to assert that the access to and quality of services remained poorer in more deprived areas despite the New Labour government's policy efforts to regenerate neighbourhoods and increase public spending. The relevance of the issue is brought to the fore under the ongoing neoliberal agenda of axing state funding to public services and weakening the ability of local authorities to run vital services. It is likely that these outcomes will have worsened after 2010 as concentrated efforts to narrow the gap in outcomes between neighbourhoods have ceased, while the cuts to local authority budgets have disproportionately affected disadvantaged areas and individuals on low incomes (Hastings et al., 2015). This implies that policy should maintain concentrated efforts on service outcomes in disadvantaged areas through more integrated approaches rather than mix initiatives.

Finally, the findings do not support the policy direction of enhancing communities' social capital in order to address imbalances in local service provision. This study concluded that the contribution of area social capital to local service outcomes was unclear and relatively small at best. A key finding was that outcomes in deprived areas were reported to be consistently worse despite accounting for the levels of social capital, which implies that social capital cannot be expected to solve inequalities in service provision. Local social capital alone is unlikely to account for improvements in service provision compared to responses that address structural deficiencies of inadequacy, costs, or unavailability of services, which disproportionately affect deprived areas (Lawless et al., 2010; McCulloch et al., 2012). Concerns have been frequently raised about the role of social capital and the community empowerment agenda in local service provision. The localism approach adopted by post-2010 governments has exacerbated the focus on local social capital by increasing the role of community participation in the delivery of public services. Commentators have noted that this community emphasis appears to act as a strategy to justify the retrenchment of state-provided

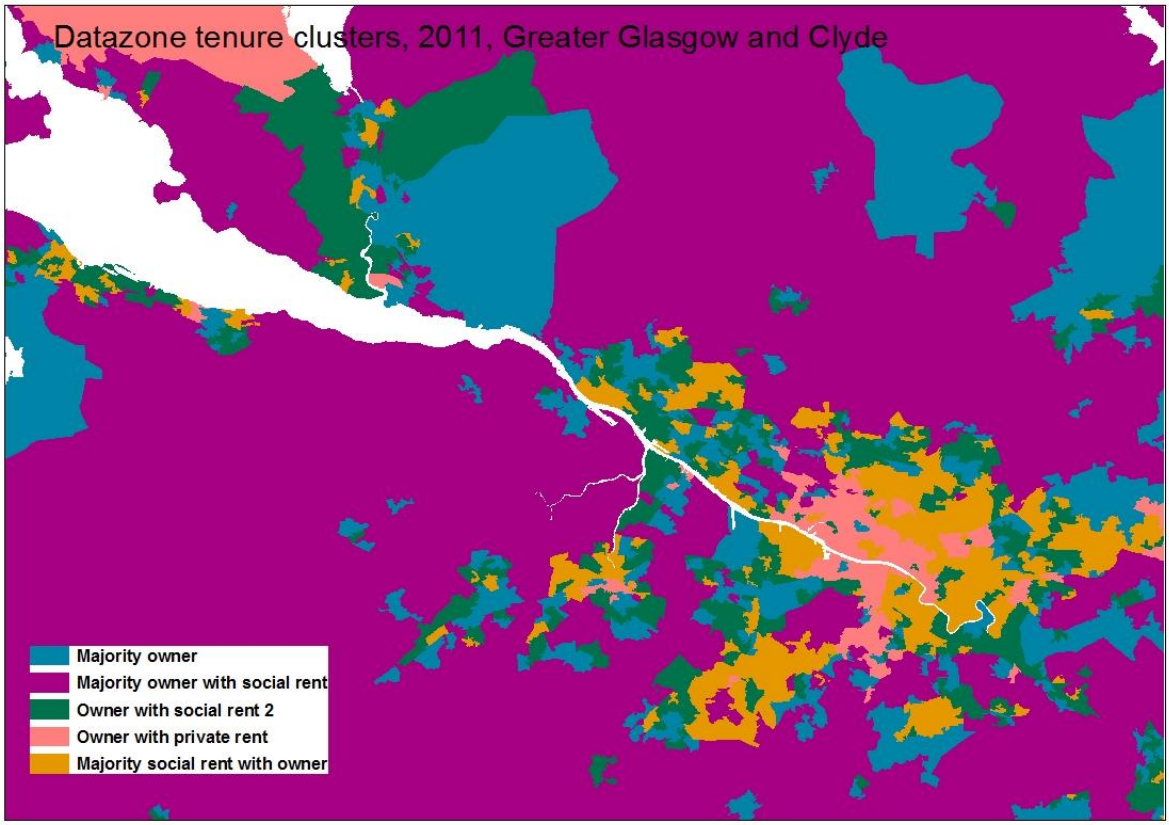
support, and argued for the need to move from local strategies to integrated policy approaches in addressing the imbalances in service provision (McCulloch et al., 2012; Rolfe, 2016; Lowndes & Pratchett, 2012; Feeney & Collins, 2015). Similarly, the outcomes of this analysis call attention to the need for better redistribution of service resources to address the differential outcomes between areas.

# Appendices

Appendix A1. Map of data zone tenure clusters in Scotland. Source: Census 2011.



Appendix A2. Map of tenure clusters in the Greater Glasgow and Clyde area. Source: Census 2011.



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